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# The Navy in the Air

"IT did me good," affirmed the Commander-in-Chief after *Verity*—the Western Union Naval Exercise described overleaf—"to see how the four nations worked together"; and he went on to advocate as the next exercise a joint operation by the Atlantic Pact Powers. This, we believe, must come about, for whatever the benefits of *Verity* as a trial of modern naval air equipment it was not altogether reassuring. Especially regrettable was the absence of carrier-borne jet-fighter squadrons, a deficiency which is not readily explained, but one which demands a remedy before the proposed Atlantic Pact exercise is laid on as a factual operation.

Whereas the U.S. Navy is already amassing operational experience with four or more jet-fighter types, our pioneer work with the "navalized" D.H. Vampire during 1945 has been followed up only by small-scale trials with "pukka" Sea Vampires and experimental versions of the Supermarine Attacker, Hawker N 7/46 and Gloster Meteor. Meantime, Naval fighter squadrons have continued to be armed with the piston-engined Sea Fury, Seafire and Sea Hornet—admirable machines of their kind, but no longer wholly adequate for Fleet defence—and only now are Sea Vampires becoming operational. A feeling expressed by more than one R.A.F. officer that precious funds are being expended on "old-fashioned" types is understandable, for rarely are the difficulties besetting the operation of naval jet fighters truly appreciated.

It is the submarine menace, however, which continues to present the most acute naval-air problems, and which is still exercising some of the country's most able brains. New forms of "A.S." weapons under development will demand new types of aircraft, and until these materialize a certain uneasiness will persist. Wide-ranging operations by naval aircraft of the Atlantic Powers will afford the finest possible experience with several types of anti-submarine aircraft, both shore- and carrier-based, and can be so planned that the results of even the most extended trials remain secret.

### Seaborne Turboprops

Evidence of the Navy's interest in attack aircraft of performance superior to that of the highly developed Blackburn Firebrand is provided by the announcement of the Westland Wyvern T.F.2 and W.35 strike-fighters, powered respectively with the Armstrong Siddeley Python and Rolls-Royce Clyde turboprops, and there is reassurance in the ability (admirably demonstrated in *Verity*) of current piston-engined naval fighters, and of the multi-purpose Firefly, to function as strike aircraft, with bombs or rocket projectiles. No evidence is forthcoming, however, of a British requirement for a pure-jet deck-landing machine in the class of the Douglas Sky-knight; this is representative of a type which might well be considered as a Sea Hornet replacement, being adaptable for all-weather fighting, attack and recon-naissance. Adequate endurance is difficult to achieve in such a machine, but our rapidly accumulating experience with flexible decks (permitting, by the elimination of the conventional undercarriage, valuable economies in weight and space) should confer upon British designers a major advantage in the development of all types of pure-jet naval aircraft.

Notwithstanding the extent of the Navy's peculiar technical difficulties and the troublous circumstances under which they must be resolved, *Flight* makes no secret of its belief in a successful issue. The Navy knows—as well as it is possible to know in these turbulent days—what it needs, and is resolutely working towards its goals, though there have been times when this could not be so confidently affirmed. Certainly, the Nelson spirit is apparent in the carriers and on the airfields, and is nowhere more evident than in the R.N.V.R. squadrons. That some twenty pilots from one of these—No. 1832—should this week be flying from H.M.S. *Implacable*, and that R.N.V.R. ratings should be maintaining the Seafires, is a tribute alike to Admiralty foresight and to the proficiency of the "Wavy" pilots.

# TRUTH IN ACTION

## *Closing Stages of Four-Power Fleet Exercise "Verity" as Seen from the Air*

*The predominant rôle of the aircraft carrier in naval warfare today is implicit in this fine photograph of Sea Hornets and Firebrands stacked on the flagship, H.M.S. "Implacable".*

WHAT curious code-names are given nowadays to operations and exercises! That for the Western Union Fleet Exercise, recently concluded, does, however, show a nice appreciation of ambiguity.

The basic purpose of *Verity* was, of course, to promote cohesion and co-ordination between the British, French, Dutch and Belgian Navies in the strategies and tactics of operating warships. To this end, the major part was inevitably played by surface (and sub-surface) vessels. This is not to say, however, that the air side of the operation was inconsiderable. Some indication of the primary importance of Naval aviation is afforded by the fact that the Commander-in-Chief of the exercise, Admiral Sir Rhoderick McGrigor, flew his flag in the fleet carrier H.M.S. *Implacable*, whilst the light fleet carrier, H.M.S. *Theseus* was the flagship of Rear-Admiral Mansergh, Flag Officer Commanding Third Aircraft Squadron. Air Forces taking part in *Verity* were commanded by the A.O.C.-in-C., Coastal Command, Air Marshal Sir John W. Baker, and controlled by A.V-M. F. L. Hopps, A.O.C., 19 Group, R.A.F.

Four squadrons of Coastal Command, two Meteor squadrons of Fighter Command, and Lincolns and Lancasters of Bomber Command, comprised the R.A.F. contribution to the exercise, in addition to which there were Sea Furies and Fireflies of the 15th Carrier Air Group, Culdrose, with which operated similar aircraft of the Royal Netherlands Navy; Mitchells of the Royal Netherlands Air Force were based at St. Eval; French Maritime Air Force Flotillas of Dorniers and Sunderlands from Brest and Wellingtons from Laurient were engaged, as well as Belgian Air Force Spitfires operating from their home bases.

Air Force phases started on July 4th with the ships comprising Blue Force approaching the Bay of Biscay, escorted by R.A.F. Sunderlands and the French aircraft, whilst the opposing White Force aircraft—R.A.F. Lancasters and Dutch Meteors—searched and shadowed. On the return voyage, the combined fleets simulated a convoy with the aircraft carriers fulfilling the rôles of large merchantmen and troopships. For this phase, the Coastal Command Lancasters transferred to Blue Force to provide air cover, whilst the Netherlands Mitchells and R.A.F. Meteors (the latter at Culdrose) were also available for Blue defence.

We were able personally to gain a perspective of part of the air sequence of *Verity* from R.N.A. Station, Culdrose, and R.A.F. Station, Binbrook. The Cornish aspect started at 1100 hours on Wednesday, July 6th, with a briefing by the Commander (Air), Cdr. A. S. Downes, D.S.O., R.N. This was followed by a tactical briefing at 1300 by the Air Group Commander, 15th C.A.G., Lt. Cdr. Nigel Ball, D.S.C., R.N. Serial I of the activity was designed to seek and destroy a force of minesweepers in Weymouth Bay; eight Fireflies with "eight R.P.s plus 20 mm cannon," were to comprise the striking force, whilst escort and strafing duty was allotted to twelve Sea Furies with "20 mm cannon." A co-ordinated attack was to be made with the Sea Furies on target at 1530, and the Fireflies at 1530 plus 10 seconds. The aim was first to kill the captain and crew by Sea Fury strafing, followed immediately by rockets delivered on the tactically vulnerable sterns by the Fireflies.

### First Strike

Airborne at 1440, we orbited base in close-finger flights, thence heading 066 deg T for Lyme Regis. Lt. Cdr. D. Empson, R.N., C.O., 814 Squadron, was strike leader, and the writer flew in No. 4 of the leading formation (Nan), being given a very nice ride by Lt. Colin Little, R.N. On our starboard quarter was the second Firefly formation (Oboe), whilst the Sea Furies of 802 Squadron (Lt. Cdr. R. Kearsley, R.N.) weaved about overhead, below, and in guardian pairs on each side of us.

Over Falmouth we opened out into battle formation and, as we flew over the dark sun-shot sea, the brown-green-skirted land of Cornwall spread a tattered hem to the lazy swell, whilst inland the china-clay hills of St. Austell were like a scattered camp of tepees. Over Lyme Regis we changed course to circle to port over Dorchester, thence turning south to pass to the westward of Portland Bill. Swinging round the Bill to the north-east, we saw the Sea Furies peel off to the attack; then, seconds afterwards, came the violent peel-off and dive toward the solid-looking sea, pulling up to a shallower dive from about 200ft at our target. A couple of frigates had just passed through the east entrance of Portland Harbour with another pair following. We attacked the rearmost ship and then swerved to attack the second just inside the entrance, thereafter jinking and skating across the harbour itself in a blood-tingling, *g*-conscious rush that was sheer delight.

Off the Chesil Bank we formed up again, and there,

steaming in line-ahead with their Orepesas streamed, were six minesweepers, but quite what they were doing and quite why they were in that rather curious position no one seemed to know. However, we decided to attack, and, turning to starboard from finger-right to finger-left, swept down and across the line of little ships thereafter to form up again and head for home.

For the second strike (Serial II) our target was the fleet in convoy, their position being given as about 20 miles due south of the Lizard. For this action we had 24 aircraft operating, 12 Sea Furies for anti-flak and close escort, and 12 Fireflies for R.P. and strafing. Only three Firefly flights would, however, be active, the fourth being relegated to decoy duties, flying across to the northward of the fleet at 10,000ft to draw attention from our attack out of the sun at oft. For this strike, the writer flew with Sub-Lt. A. H. M. Hagdorn, of No. 4 Squadron, Royal Netherlands Naval Air Service.

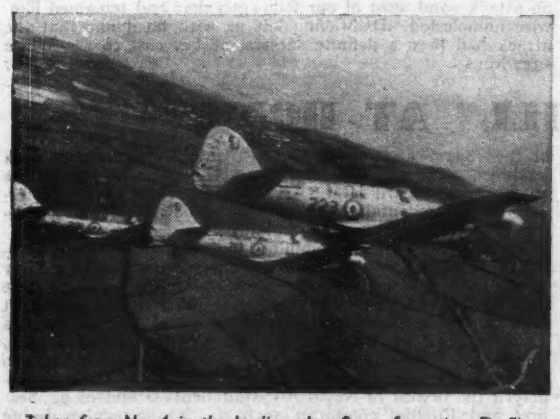
### International Action

The Dutch contingent at Culdrose comprised seven Fireflies and three Sea Furies, which operated as part of 15th C.A.G. In the absence of their C.O., Lt. H. de Wit (who was in *Theseus* with the six R.N.N.A.S. Fireflies which added to the ship's complement), the squadron was commanded by Lt. J. Helfrich. It says much for the quality of the Dutchmen that, despite curtailed flying practice—due to international economics—and their never before having flown as part of an air group, they formated and attacked with the 15th C.A.G. as to the manner trained. To state that, apart from sectored roundels, one would not have known that the formations were not wholly British is not smugness; it is high praise.

Taking off at 1925 we headed south-west out to sea in battle formation, passing the Wolf Rock Lighthouse below lantern level at 190 kt I.A.S., then, when the cloud-capped Scillies appeared as soft grey shadows on the horizon, breaking the white-gold effulgence of the sun, we turned in a large sweep round to port to come on the fleet.

When we first sighted the "enemy," they looked like large white-caps on the horizon, but rapidly grew into a force of four carriers, with the battleship *Anson*, closely protected by screening destroyers. At 2000 hr we were running down the westward side of the formation; then we turned and attacked, streaking up the lines of ships and "firing" our R.P.s. The writer's Firefly, after flashing over the French destroyer *Formidable*, rocketed the flagship *Implacable*, and then, jinking and weaving madly, we were away.

From the casual hand-waving attitude of men strolling about on the flight-decks, it appeared as though an attack was the last thing they were expecting, and in this connection it subsequently appeared that there had been some confusion about time-on-target; from the 15th C.A.G. point



*Taken from No. 4 in the leading close-finger formation, Fireflies of 802 Sqdn., 15th C.A.G., set out for the Serial I strike on minesweepers.*

*Lowering his wheels and starting his orbit, the pilot of a Firebrand prepares to land on "Implacable."*

of view, however, instructions were faithfully carried out.

The third strike was designed as a repetition of Serial II, with time-on-target as 0600 Thursday morning, the fleet's position at that time being scheduled as due south of Lyme Regis and due east of Start Point. After much too little sleep, we were "shaken" at 0315 and, after an unappreciated breakfast, collected safety-equipment and mustered in aircraft at 0430. There was a certain magic about the picture of lines of aircraft starting up, with exhaust stacks breathing flames of palest mauve and yellow which changed to a deep pink as the engines were run up. Taking off at 0510, we orbited and then, at 0521, flew over base on course for Lyme Regis, opening out from close-finger to battle formation. For this strike, the writer was passenger to Lt. R. D. R. Hawksworth, R.N., flying No. 3 in the leading formation, Nan, with our other formations, Peter and Oboe, on our port and starboard quarters. In the silky early morning air, as we passed over Carrick Roads, the young sun crowned the livid clouds with a peachy blush; to seaward there was no horizon, just a pearly haze with ivory mares'-tails painted on the blue above.

At 0552, we swung out to sea over the terraced grey cliffs of Lyme Regis, descending gradually and turning to the south-west. Visibility was about 2½ miles on the surface and we picked up the "enemy" steaming north-east; passing over the screening destroyer force, we ran down the line of ships on their starboard hand, then turning in to deliver our rocketry. We ourselves again attacked *Implacable*, Peter on our port quarter going in to hit *Victorious*, which was lying beyond *Anson*, whilst Oboe, on our starboard quarter, attacked *Theseus*. Considering the visibility conditions, the ToT 0601.30 (30 seconds late) was praiseworthy. After the attack, the Firefly flights formed up again and we headed inland for Yeovilton to refuel, putting down there at 0640.

Cups of tea and bacon sandwiches were very welcome, but we then had an unexpected wait, as the last operation—a fly-past over the anchored fleet in Weymouth Bay—was delayed. There was a certain amount of vacillation here,

## Truth in Action . . . . .

but finally we did get airborne to fly in close-finger flights in line-astern over the fleet at 1210. The fuel situation was such that, after this, we again had to land at Yeovilton, who rose magnificently to the occasion in providing lunch for 36 hungry men.

Mention must be made of the terrific job done by the maintenance crews at Culdrose; their spirit was wonderful and they worked all hours to succeed in giving 15th C.A.G. 100 per cent aircraft serviceability. In this connection, the Dutch personnel deserve equal merit, for they did the same. The exercise, as seen from one operational viewpoint, provided a most heartening picture of Naval aviation. The right men are there and they have the right spirit; they must never lack for the right equipment. C. B. B-W.

## DAWN ATTACK BY RADAR

JUSTIFIABLE satisfaction in Binbrook's contribution to the highly successful operational and servicing record maintained by Bomber Command throughout *Foil* was very apparent when *Flight* visited this Lincolnshire station last week. Crews who had been airborne on almost every night of that exercise were looking forward to further valuable experience in the form of a dawn bombing strike on a combined fleet of the Western Union Navies. In addition, the success expected in *Verity* would more than amend for the opportunities lost last December in *Sunrise*.

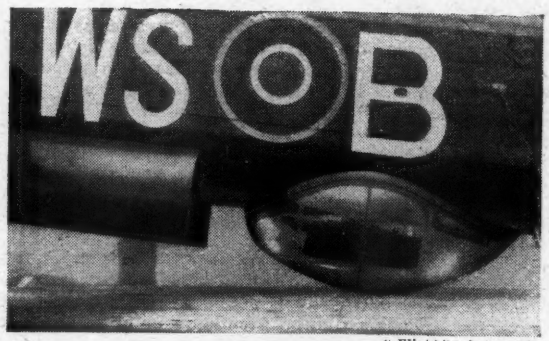
It was with a reference on these lines that W/C. "Hamish" Mahaddie, D.S.O., D.F.C., A.F.C., Binbrook's Wing Commander Flying, opened the briefing at 23.15 hr on July 6th, of 14 Lincoln crews detailed to represent the station in No. 1 Group's attack early the next morning. A total force of 44 Lincolns were to be engaged, and their objective was the Blue task-force, believed to consist of 19 capital ships with a large escort. Two parallel rows, spaced at 1,000 yd, of cruisers, battleships, aircraft carriers and supply vessels, contained the major targets. In order of priority, these were the carriers *Implacable* and *Victorious*, the battleships *Anson* and *Lorraine*, and the light fleet carriers *Theseus* and *Arromanches*.

Navigating and bombing (either visually or by radar, according to weather) would be undertaken independently by each Lincoln, but for the actual attack bombers would fly in a "gaggle" at 17,000ft—maintaining visual contact after arriving at the rendezvous point 15,000ft above the Scilly Isles. The route had been chosen to "collect" as many interceptions as possible in order to give practice to the Western Union fleets in calling up fighter assistance.

After a final "Good hunting" from the Station Commander, G/C. A. A. Adams, D.F.C., crews prepared for the take-off. The last of the 14 Lincolns was airborne within 14 min 15 sec of the first. Ninth to depart, we took off in B-Baker (captain, F/O. Trowbridge) of No. 9 Squadron, which is commanded by S/L. P. A. Ostle, and has the exceedingly appropriate motto, "We Fly by Night."

A number of the Binbrook Lincolns—including B-Baker—were recently equipped with H2S4A radar sets. Although similar in principle to the Mk 3A equipment previously carried, the newer set offers a number of tactical advantages—some of which were evident in the excellent P.P.I. (plan position indicator) photographs, taken during *Foil*, which were pinned up in the briefing room.

Seated next to F/L. Smith, the radar operator, we were in a good position to observe his manipulation of the H2S controls. Most noticeable effect of the new installation was the increased clarity of the picture shown on the P.P.I. screen. Range likewise benefits. Navigation is greatly facilitated by the single switch which gives four variations in the scale of the area covered by the scanner (one-in-250,000, one-in-500,000, one-in-1,000,000 and one-in-2,000,000), as these proportions correspond to the maps employed. According to the scale in use, distances are judged on the P.P.I.; at the smallest end of the scale the space between the concentric rings on the screen represents a distance of two miles, and it increases in proportion to the other three settings.




"Flight" photograph

*Scanning equipment for the latest H2S4A radar set, as carried by a number of the attacking Lincolns.*

We had flown over the target area predicted at briefing before any nautical reflection was received through the cloud-layer. Two domino-like rows of dots on the screen, sighted south of Start Point, on the one-in-1,000,000 scale, caused some dissension between the navigator and the radar operator as to the probable cause. Following magnification on the next scale, they agreed that this *was* the main enemy force, and we turned about for our bombing-run. It was then that a further advantage of the set was apparent. F/L. Smith turned on to the largest scale as the run began (we then saw clearly that in the port row there were eight ships and six in the starboard) and issued course-directions to the pilot until the track marker, a line on the P.P.I. representing our own path, was pointed at the heart of the Naval formation. In the centre of the screen was the "release circle." When the intersection of the track marker with the circumference of this circle coincided with the centre of the lines of ships, the radar operator completed the attack by pressing the button of a 35 mm camera which he had positioned over the P.P.I. during the run-up. Thus, at "bombs away and during the entire attack, the air bomber's position had been vacant throughout.

Returning to base, we found that the cloud-base was down to 800ft. However, due to the landing procedure in operation (whereby aircraft arrive singly at a predetermined E.T.A. at the "gate position"—in this instance, Spurnhead—and are given precedence for touch-down) all the aircraft were safely down within 30 min. We in B-Baker had seen but a single "E.A."—a Mosquito which crossed below us without making an attack—and most of our fellow-gagglers had remained likewise unmolested. De-briefing left us with no doubt that the attack had been a definite success, at low cost to the White squadrons. R.J.B.

# H.M.S. "HORNBILL" AT HOME

SURVEYING the scene on Culham airfield last Saturday afternoon, we felt that there was much to support the contention, expressed by the C.O., Capt. J. W. Grant, R.N., that this Royal Naval Air Station is the most attractively situated in the British Isles. Not only is the surrounding Oxfordshire countryside a most pleasant setting, but the layout and condition of the airfield itself are exceptionally tidy. Introduced by Capt. A. M Kimmins, O.B.E., the Honorary Commander of No. 1832 (R.N.V.R.) Air Squadron, Cdr. Douglas Fairbanks, K.B.E., D.S.C., received an enthusiastic welcome when he initiated the flying part of the Naval Air Day.

Naval Aviation—old and new—was fully represented in the ensuing display. Plt.1 Blood, from Gosport, was first to take off, for a suitably dignified demonstration of what must surely be the last serviceable Swordfish. Six Seafire 17s of 1832 Squadron and six Firefly 5s of No. 1 Flight Ferry followed, and while they formed up for an excellent low-level fly-past, a Sea Mosquito and a Sea Otter performed. On return, three of the 1832 Seafires were "batted down" for dummy deck landings. The squadron has evidently trained hard for its 10-day spell aboard H.M.S. *Implacable*, which began yesterday It is, incidentally, the first post-war R.N.V.R. air squadron to go to sea for annual training.

Further variety was exemplified by spirited Sea Fury aerobatics, Lt. Robertson's masterfully crazy evolutions in a Tiger Moth, a surprisingly agile Barracuda, and comparative R.A.T.O.G. and unassisted Firefly take-offs. Making the best of a fairly low cloud-base, Lts. Clarke and Perrett, on Sea Vampire 20s from Culdrose, and Lts. Ferguson and Martin, flying 739 Squadron Sea Hornets, were responsible for two excellent high-speed formation items, while Lt. Kilburn displayed the newest of Naval Air equipment—a Meteor 7. Seafires and Fireflies combined again for a spectacular diving attack on the airfield, and 13 R.A.F. parachute instructors from Upper Heyford descended from a Dakota for a fitting conclusion to an excellent afternoon's entertainment.

# THE NATIONAL AIR RACES

## *A Royal Entry : Enclosure and Parking Arrangements*

HER ROYAL HIGHNESS PRINCESS MARGARET has entered an aircraft for the King's Cup Race, bringing the total entry for that event up to 39. The machine—which will fly in the third heat and bear the racing number 39—is a Miles Whitney Straight (Gipsy Major I), G-AEUJ, and the pilot will be G/C. Peter Townsend, D.S.O., D.F.C. This brings the total entry for the National Races up to 91.

Full details of enclosure arrangements and prices have now been issued by the Royal Aero Club and, with application forms for tickets, are obtainable from the Club at 119, Piccadilly, London, W.1.

There are three public enclosures, known as Tiger's Island (facing the western half of No. 1 runway), Marston Green (eastern half) and Metro (facing No. 2 runway). Admission to any of these three enclosures is 2s 6d on the Friday and Sunday and 5s on the Saturday and Monday. There is a grandstand in each, seats in which (inclusive of admission charge) cost 7s 6d on the Friday and Sunday and £1 on the Saturday and Monday. In all these cases children under 14 are admitted at half price. Buffet bars will operate in all enclosures. Special arrangements, including a private enclosure and grandstand, have been made for R.Ae.C. members and their guests.

* * *

Car parks for the Tiger's Island and Marston Green enclosures are immediately at the rear of the grandstands; for the Metro enclosure there are two parks, one adjacent to the enclosure and the other outside the airfield, on the north side of the Birmingham-Coventry road. Parking fees are:—

| | Fri., Sun. | Sat., Mon. |
|---|---|---|
| Cars | 5s. | 10s. |
| Motor cycles | 1s. | 2s. 6d. |
| Cycles | 6d. | 6d. |

* * *

A comprehensive traffic-handling scheme has been worked out by the Royal Automobile Club and approved by the Chief Constables of Birmingham and Warwickshire. Cars will be routed in accordance with coloured windscreen-labels issued to advance-purchasers of parking tickets.

* * *

In addition to the trophies (illustrations of which have appeared in *Flight* of June 30th and July 7th) considerable sums of prize-money are offered. In most cases there is £100 for the trophy winner, with proportionate sums for second and third while pilots making the fastest actual times, exclusive of handicap, will receive £20.

Public-address equipment, and an intercommunication system for the various officials, is being installed at Elmdon by Hadley Sound Equipments, of Birmingham.

* * *

An indication of the size of the crowds expected is that 500 police are to be on duty during the race period, 100 of them inside the Airport. In all, some £10,000 is being spent on the ground organization, about £500 of it on a new road, 180 yards long, leading directly to one of the enclosures.

* * *

Cdr. B. J. Hurren, of the Fairey Aviation Co., is in charge of Press arrangements for the meeting. Pressmen starved of advance information at previous affairs of this kind look like having no grounds for complaint this time—unless it be on the score of burial in an avalanche of typescript.

* * *

Most minutely detailed instructions are being issued to competitors to regulate their movements from the moment of take-off until they join the main stream of other aircraft already started in the handicaps. Differing regulations, too, are set out to cover various conditions of wind-direction. Such precautions, of course, are vital in races round a short circuit.

### THE FOUR-DAY PROGRAMME

**Friday, July 29th**

**Morning.**—Aircraft arrivals.
**Afternoon.**—Practice flying for King's Cup and Kemsley Trophy competitors.

**Saturday, July 30th**

**Morning.**—Verification of King's Cup and Kemsley Trophy aircraft.
**Afternoon.**—(1) King's Cup heats and final; (2) Kemsley Challenge Trophy (international handicap for any type of over-300 m.p.h. aircraft).

**Sunday, July 31st**

**Morning.**—Arrival of aircraft for afternoon events.
**Afternoon.**—R.Aux.A.F. Race for Cooper Trophy; practice for Monday's events.

**Monday, August 1st**

**Morning.**—Verification of aircraft competing in afternoon events.
**Afternoon.**—(1) Grosvenor Trophy (international handicap for aircraft of under 1,000 kg a.u.w.); (2) Air League Challenge Cup (international handicap for over-250 m.p.h. piston-engined aircraft); (3) Norton Griffiths Trophy (international handicap for aircraft of 1,000-1,750 kg a.u.w.); (4) S.B.A.C. Challenge Cup (international handicap for jet aircraft); (5) Siddeley Trophy (handicap race for British aero clubs).
**Fastest Lap:** The Geoffrey de Havilland Trophy will be awarded for the fastest lap made either during practice or in a race.
**The Course:** A 20-mile quadrilateral. Two, three or four laps will be flown, according to the race. A map of the course appeared in *Flight* of June 16th.

## NEW NOTE AT REARSBY

ORIGINALITY was, perhaps, the key to the success of the flying display at Rearsby last Sunday, organized by the Auster Flying Club. In addition to the usual run of aerobatics and demonstrations which form the backbone of any flying display, there were several items which were both original and spectacular. S/L. Porteous was up to his usual aerobatic form with the M.18 and the Goodyear Auster, but his party-piece, in an Autocrat, was a dead-stick landing in front of the control tower. Another highlight was a dog-fight between Mr. Neville Duke in a Hawker Tomtit and Mr. Morell in a Tiger Moth, the outcome of which was the realistic shooting-down of the Tiger, from which the supposed pilot baled out. The Tiger continued to spin towards the ground, much to the consternation of the spectators, who were greatly relieved when it finally made a circuit to land. Messrs. Hough and Bullmore gave an exhibition of clever crazy-flying under the guise of inexperience, and "Prof. Clueless" must have shattered the feelings of many onlookers with his low steep-turns and with his attempt at following another Tiger Moth through some aerobatics.

An original method of opening the display was marred by late arrivals by air. At 2.30 p.m. one of the club aircraft attempted to introduce Mr. Lindgren and call upon him to open the display: for this purpose use was made of an airborne loudspeaker which, incidentally, Austers are developing for police and military purposes. In competition with the noise of landing aircraft Mr. Lindgren wished the club every success.

The remainder of the 17 items in the programme, which ran precisely to schedule, included tied-together formation flying by Tiger Moths from No. 7 Reserve Flying Centre, Desford, and individual aerobatics by Harvards of the Central Flying School, Little Rissington. A Vampire and a Meteor from R.A.F. Station, Leconfield, both gave inspiring aerobatic and low-flying demonstrations in a cloudless sky ideal for the occasion. Three Seafires from Bramcote performed formation aerobatics in well-timed alternation with a single aircraft from the same station. It was estimated that some 10,000 people watched the display.

## INFORMALITY AT REDHILL

THE Redhill Flying Club's garden party last Saturday was a real garden party inasmuch as that, while the members and guests sat on the lawn, most of the flying was virtually from, over or on to the same lawn. Nearly all the aircraft and nearly all the pilots were club members. There were three demonstrations proper. One was of the Lycoming-engined Aerovan flown by Ian Forbes, which was at the same time unbelievable and convincing. The second exposition was by the Surrey Gliding Club, starting with steep turns and beat-ups by an Auster with a glider in tow and ending with unlinked aerobatics; Mrs. Ann Douglas flew the tug and Lorne Welch the Olympia sailplane. The third demonstration was one of standard aerobatics in a standard Magister, very smoothly executed by C. A. N. Bishop. There was also some formation flying on the club Magisters.

The rest of the programme consisted of competitions, the first of which was an obstacle race, in which the passengers had to crawl under mats and the pilots to do some very accurate spot landings. The second was a bombing competition, won by Mr. Bearcroft in a Piper; he hit the 8ft target twice out of three times.

The programme finished with a mock combat between two Magisters with Very-pistol "armament," and the party ended with a dance in the clubhouse.

# HERE AND THERE

## Commonwealth Vampire Airborne

MR. ARTHUR DRAKEFORD, the Australian Air Minister, announced last Thursday that the first Australian-built Vampire had successfully completed its initial flight tests.

## Oh Well . . .

"THERE was considerable anxiety as we found difficulty in 'feathering' the propeller, but later we saw it fall off. From then onwards things became more normal."—The captain of the turned-back Stratocruiser, as quoted in a London evening paper.

## W.J.A.C. Under Canvas

FOUR young pilots of the Women's Junior Air Corps—all holders of "A" licences, for which they were trained under the W.J.A.C. scholarship scheme—are at present sharing a summer camp at Elstree Airfield with members of the Ultra Light Aircraft Association. They are flying Piper Cubs under the instruction of Mrs. Patterson and Miss Vera Strodl.

## Quid Pro Quo

DURING one of the strikes in Exercise *Verity*, the starboard outer wing of one of the Netherlands Sea Furies collected a seagull, which made an incursion into the leading-edge. Back at Culdrose, the maintenance crews got on the job without delay and, in five hours, had fitted a new outer wing. However, as the Dutch had not brought such elaborate spares with them, it was a British wing which was fitted, and that is the story behind the oddly marked aircraft (shown below) which may have puzzled spotters in Cornwall last week.

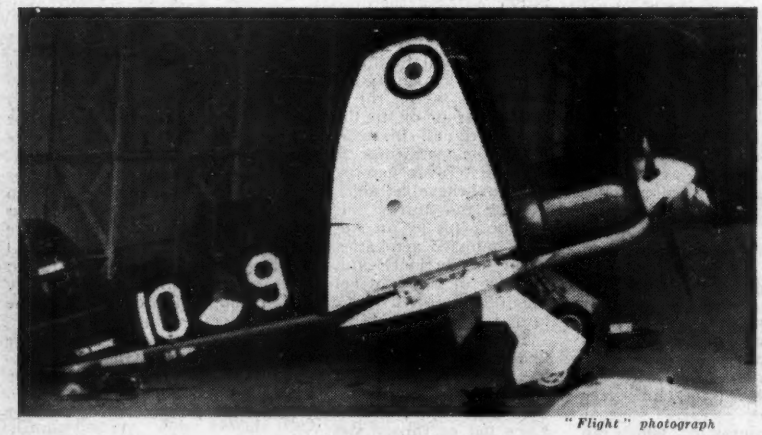
*CLOSE CONTROL: Pest Control, Ltd., displayed one of its Westland-Sikorsky S-51 crop-spraying helicopters at the Royal Show, Shrewsbury, recently. Guided by hand signals from Mr. R. Bryant, (the company's chief engineer), Mr. J. Harper landed the S-51 on the 20 ft-square roof of the Pest Control stand with only 2 ft clearance between the tail-rotor and a flagpole.*

## Millions for Missiles

AUSTRALIA'S expenditure under the five-year defence programme will be increased by £36 million, in part for the manufacture of a "new-type bomb" and rocket projectiles.

### FORTY YEARS BACK

"The Wright Brothers have applied for a patent for a supplementary mechanical control which will, when required to do so, relieve the pilot of the necessity of manipulating the elevator, rudder and warping levers by hand. The power . . . is compressed air. The mechanical brain . . . is in one case a pivoted vane acting under the influence of wind pressure and in the other a pendulum."—*From "Flight" of July 10th, 1909.*




*"Flight" photograph*

*WESTERN UNION: As related in the paragraph above, it was a mere seagull, and not a further manifestation of close co-operation between Britain and Holland, which brought about the unique mixture of markings on this Sea Fury.*

## Jet Bomber Named

BRITAIN'S first jet bomber, the English Electric A.1, is now officially styled the Canberra 1. No details of the aircraft—other than that its power units are two Rolls-Royce Avons—are yet available for publication. Its first flight was made on Friday, May 13th. No reason has been given for the selection of a name with this Commonwealth association, but there has been an unofficial report that Australia is to build one type of British medium jet bomber.

## Flush-Duct Thunderjet

AN increased rate of climb and unchanged stability characteristics are reported to result from the substitution of flush side air-inlets for the normal nose air-intake of a standard Republic F-84 Thunderjet. The possibility of producing a night and all-weather intercepter version of the F-84, with the consequent need for nose-installed radar equipment, led the Republic Corporation to make this modification. A two-seat night-fighter version of the Lockheed F-80 was illustrated in last week's *Flight*.

## Cadets See "Sunray"

SIX Lancasters were due to leave Mildenhall, Suffolk, last Tuesday on Bomber Command's regular monthly training exercise in the Middle East—Exercise *Sunray*. Four A.T.C. cadets of No. 301 (Bury St. Edmunds) Squadron were allotted seats in the accompanying Dakotas carrying 59 ground crew members of the bomber squadron. Incidentally, seven cadets of No. 1403 (Retford) Squadron flew from Binbrook in the sortie made by Bomber Command Lincolns, as part of Exercise *Verity*, described in this issue.

## R.C.A.F. Instructors Here

INSTRUCTORS from the Royal Canadian Air Force Central Flying School, Trenton, Ontario, are here for a three-week visit to study R.A.F. training methods and discuss mutual training problems. This will be the first liaison visit paid to this country by R.C.A.F. flying instructors, although a party of

## HERE AND THERE

air navigation specialists made a similar visit several months ago.

The R.C.A.F. party, which is staying at the Central Flying School, Little Rissington, Glos., arrived from Canada in a Lancaster.

### Helicopter Tour

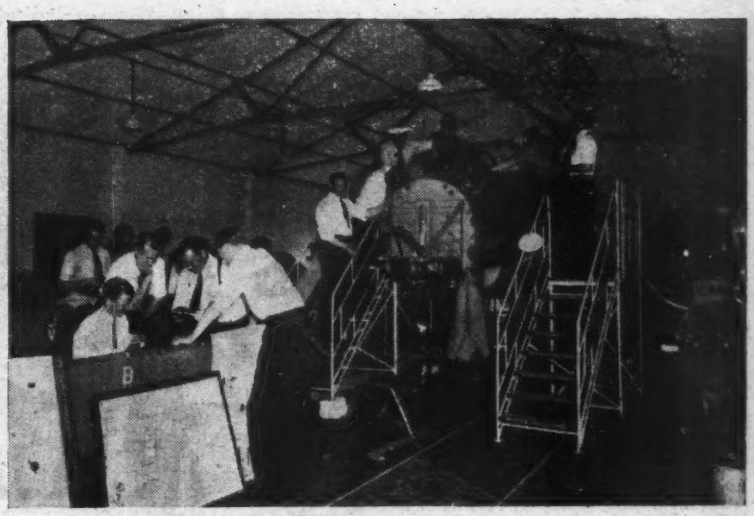
DURING a tour of American air bases, started on May 22nd and recently concluded, the Kaman twin-rotor helicopter carried more than 1,000 passengers and "flight-checked" some 200 helicopter pilots for flying this type of craft. With the makers' chief test pilot, W. R. Murray, at the controls, daily flying time averaged 5½ hours.

### Studying the Meteor

TWENTY officers and warrant officers of the Danish Navy and Army Air Forces, under the command of Capt. Wickmann, are taking a course of instruction on the Meteor airframe at the Gloster factory. The pilots are also receiving flying instruction on the Meteor 7. After two weeks they will proceed to Rolls-Royce to familiarize themselves with the Derwent, and, having returned home, will form an instructional nucleus for the operation of Meteor 4s. Denmark is understood to be contemplating a separate and unified Air Force.

### Hydrofin Challenge

THE designer of the unconventional Hook Hydrofin—a marine craft with an undercarriage carrying surfaces of aerofoil shape, upon which it planes—has issued a speed-contest challenge to other marine craft of approximately 18½ft length and 150 h.p., to be decided during Cowes week (July 30th-August 6th). The Hydrofin, which is driven by a Pobjoy engine and airscrew, was described in *Flight* of November 11th, 1948. Concurrently with the Cowes challenge, owners of model Hydrofins powered by Jetex 350 rocket units are invited to take part in a contest.



*INFORMATION EXPORTED: The supply of British jet fighters to friendly foreign countries has entailed far more than mere delivery of aircraft. Denmark, for instance—which recently ordered 20 Meteor 4s—has sent service representatives (seen above) to the Gloster Aircraft Company for a two-week course of instruction, as related in the adjacent paragraph.*

## News in Brief

MORE than 50 de Havilland Beavers have now been delivered (to Europe, Africa and Canada) and other orders are on hand from South America.

* * *

An R.A.F. Anson pilot, F/L. Adams, last week spotted fire on a Martlesham, Suffolk, farm and called up his station control, which sent a fire-fighting jeep to the scene.

* * *

Mr. Peter Thorn, only son of the late Capt. S. A. ("Bill") Thorn and a test pilot at the Avro Woodford Works, was recently married to Miss June Isobelle Prall of Cotes Hall, Stafford.

* * *

As from July 1st, Rediffusion, Ltd., makers of radiocommunications and electronic equipment, have changed their title to Redifon, Ltd. Their address remains at Broomhill Road, London, S.W.18, but the telephone number is now VANdyke 5691.

* * *

Mr. O. J. Tapper, late of the Esso Aviation Organization, has taken up a position in the central public relations department of the de Havilland Aircraft Company. During the war he flew as a lieutenant commander in the Fleet Air Arm.

* * *

S/L. B. Walford, with F/L H. W. H. Tudor and three N.C.O.s, has been seconded by the R.A.F. to the Royal Geographical Society for the Norwegian-British - Swedish Antarctic Expedition, 1949-52, which is to leave for Queen Maud Land in November. Two Austers will be taken, for photography, reconnaissance and supply-flying; they will operate on skis from the ice-floes.

*S/L. Brian Walford.*

* * *

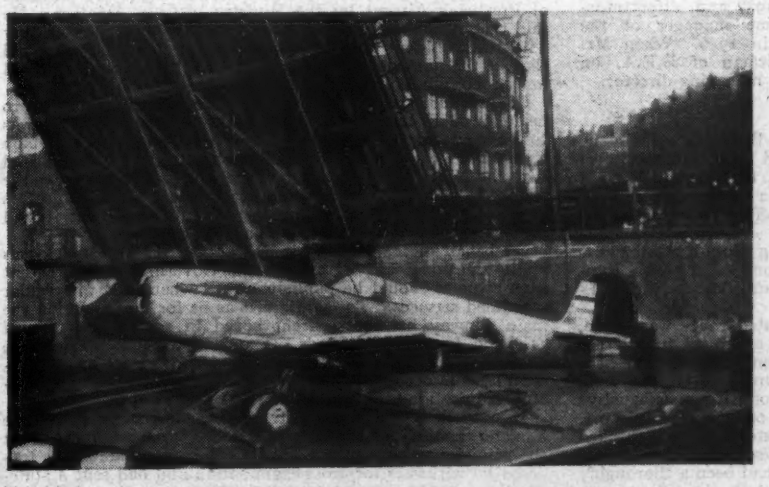
Mr. Alex Fraser, vice-chairman of Girling, Ltd., the brake manufacturers, is to fly to America on July 28th for a business tour in company with Mr. J. W. Kinchin, chief engineer.

* * *

Camera-users will find helpful the *Standard Guide to Exposure*, published by *The Amateur Photographer* in accordance with the new B.S.I. Standards. (Price 7d by post, Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.)

* * *

On the resignation of Mr. A. E. Nicholson (who retains his seat on the Board), Mr. J. J. Parkes, managing director of Alvis, Ltd., has been appointed chairman. Mr. R. W. Rutledge becomes deputy chairman and financial director.



*AIRCRAFT CARRIER: Repairs and overhauls of many different makes of aircraft are undertaken by the Fokker works at Amsterdam, and all but the biggest (Skymasters and Constellations) are transported between the factory and Schiphol by canal barge. This picture of a Dutch Army Spitfire passing a lifting bridge in the city was sent by an Amsterdam reader, Mr. A. N. Viterwijk, jr. A tunnel mouth accounts for the curious "rudder."*

# CIVIL AVIATION NEWS

*B.E.A. Resignation : Prestwick Dispute : London-Paris Services*

*PROVEN ARGONAUT : The crew of "Ajax" soon after landing at London Airport from the proving flight to Tokyo. Left to right : Capt. M. W. Haddon, Nav. Off. J. D. S. Sloper, Capt. C. N. Pelley, Stewardess M. C. Terry-Smith, Nav. Off. D. G. Dodson, Capt. A. P. W. Crane (proving-flight captain), Capt. T. H. Farnsworth, Capt. J. C. Harrington (No. 1 Line manager), Eng. Off. F. B. Jones, Rad. Off. C. E. Wilcockson, Rad. Off. J. H. Lewis, Steward J. Cocklin. Also on the flight were Capt. Lilley, Canadair chief pilot, and technical observers from Rolls Royce, Marconi, B.O.A.C. Development Flight and Project Branch, and M.C.A.*

## SIR HAROLD HARTLEY

FORMER Ministers of Civil Aviation were guests at a farewell luncheon to Sir Harold Hartley, given by Lord Pakenham, last Thursday. The Minister said it would be difficult to find anyone whose service to the community in so many ways was more meritorious. Civil aviation, he said, had had the benefit of Sir Harold's experience, and the country was grateful for his work. Sir Harold, in reply, emphasized that the airline corporations were commercial enterprises in an extremely competitive international business, and for success they must have full responsibility and the maximum possible freedom. It was only by having that responsibility that the leadership on which success depended could be obtained from the Corporations' staffs.

Tributes to Sir Harold Hartley's achievements during his chairmanship of B.O.A.C. were paid also by Lord Winster, Lord Nathan, Mr. Lindgren, Sir Miles Thomas and Sir George Cribbett.

## J. V. WOOD RESIGNS

IN a recent letter to the Minister of Civil Aviation, Mr. J. V. Wood, chief executive of B.E.A., has intimated that he does not wish to renew his appointment, which expired on June 30th. His reasons have not been made known but it is understood there is no disagreement with the chairman, Lord Douglas.

Appointments to the Boards of Corporations and those of chief executive are made by the Minister and a successor has not yet been named. Mr. Wood joined British Airways as assistant to the operations manager in 1937 and, after transferring to B.O.A.C., eventually became manager of the Eastern Division of that Corporation in 1946. When Mr. Gerard d'Erlanger was appointed chairman of B.E.A. on July 1st, 1947, Mr. Wood was appointed managing director.

## AJAX RETURNS

AT 1310 hr last Friday, *Ajax*, one of B.O.A.C.'s Canadair, or Argonaut, class aircraft, arrived at London Airport after a gruelling 25-day proving flight to Tokyo. With a normal crew plus supernumeraries and a full complement of technical observers, the aircraft took off on June 14th and flew along the following route: Rome - Cairo - Bahrein - Bombay - Colombo - Singapore - Hong Kong - Okinawa - Tokyo - Hong Kong - Manila - Hong Kong - Bangkok - Rangoon - Calcutta - Delhi - Karachi - Teheran - Basra - Baghdad - Damascus - Nicosia - Malta - London.

A complete inspection of the anticipated route was made, let-down procedures were checked and approved for all the airports and alternatives, and sufficient information was obtained to produce operational procedures and cruising control for the Argonauts in service. At Hong Kong, exhaustive landing and take-off tests were made on Kai Tek airport. Flying times between airports on the route have been checked and the aircraft was flown to a strict schedule throughout.

Capt. Crane said on his return that it had been a thoroughly successful trip which had confirmed B.O.A.C. plans for operating the type on routes to the Far East. He could foresee no major problems, since the troubles met on this proving flight had been negligible and it was significant that the aircraft had arrived back on its scheduled day. Capt. Crane, who is a Constellation pilot, was enthusiastic about the general behaviour of the Canadair Four under tropical conditions. They had flown in all sorts of weather, perhaps the most gruelling being in the Persian Gulf in mid-summer.

Pack-up spares were carried to meet emergencies, but the distribution of spares along the route is progressing normally and B.O.A.C. expect to start operations within the next two months so that the whole fleet will be operating early in 1950. *Ajax* is the second Canadair Four delivered, the first is being used entirely for crew training, which is well under way. The type will be operated by No. 1 Line which has been resurrected and of which the manager is Capt. J. C. Harrington.

## PRESTWICK ACQUISITION

MR. D. F. McINTYRE, managing director of Scottish Aviation, Ltd., appeared as first witness in the hearing, at Ayr on June 30th, of objections to the compulsory purchase of Prestwick Airport by the Ministry of Civil Aviation. He said there would not have been an airport but for the company with their resident and responsible management and predicted that, if the purchase order was made, Scottish Aviation would lose a considerable amount of business.

Counsel for Scottish Aviation protested at the procedure to be followed in the case, since a comprehensive statement was to be made by an assistant secretary of the M.C.A. which would not be open to cross-examination. Counsel submitted that the Minister had failed to follow the procedure under the Act; the proceedings had been represented to the objectors as a hearing of objections before a commission, but it had in fact been advertised as a public local enquiry.

On behalf of the Minister it was argued that Prestwick was an international airport and it was Government policy that such airports should be publicly owned when used for regular scheduled services. To maintain it as fit for that function the main runway had been strengthened in 1948, at a cost of £170,000 from public funds. The Minister was prepared to offer the company an opportunity of continuing on a long-term lease in occupation of such premises as they might reasonably require for their business.

In a further protest against the procedure adopted by the Minister, counsel for the objectors said it was an anomaly that the Minister, who was not legally represented, and had tendered no witnesses for cross-examination and had sent a statement upon which no cross-examination was allowed, should claim the right to reply to the case.

In his summing up for Scottish Aviation, counsel complained that the Minister's representatives had given no explanation of why a change of ownership should take place. Prestwick

had become an airport as a result of the initiative, enterprise and hard work of the company and there was a danger that the industry which had been built up would be killed by compulsory acquisition.

The report will be submitted to the Minister, with whom the final decision will rest.

## ACCIDENT REPORT

THE Chief Inspector of Accidents, A. Cdre. Vernon Brown, reports* that he has been unable to determine the cause of the accident involving Dakota G-AJBG which occurred at 01.54 hr. on May 20th, 1948. The aircraft was owned by Air Transport (Charter) (C.I.), Ltd., and was on a charter flight from Valence, France, to Bovingdon with a cargo of fruit.

While making a circuit of Bovingdon beneath a cloud-base which had lowered to 300ft, the aircraft flew into a wood about half a mile from the airfield and was wrecked. Fire did not break out, but Capt. Boalch, Radio Officer T. G. Young and Flight Engineer H. Spencer were all killed. The First Officer, G. Castellain, was seriously injured.

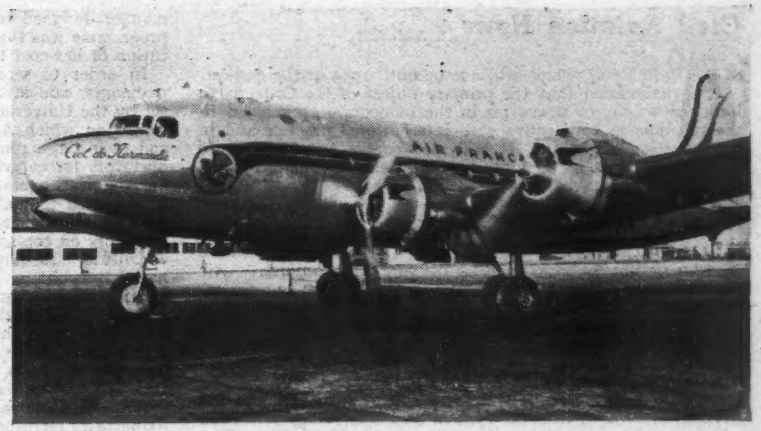
The Inspector was unable to find evidence of pre-crash failure in the aircraft or its equipment and at the time of the accident the undercarriage was down and the airscrews were in fine pitch. The pilot had not requested or obtained clearance before entering I.F.R. conditions in the vicinity of Bovingdon and he had been informed that the cloud-base was 400ft. This height was below the minimum recommended for the approach procedure adopted by him. The pilot had not been informed that the cloud-base was in fact 300ft at the time of his arrival, nor that it had been as low as 200ft earlier. The Inspector considered that control of the aircraft from Bovingdon was not carried out with a high degree of efficiency.

**M.C.A. Publication 71. H.M. Stationery Office; price 9d.*

## WINTER FARES

AT a recent I.A.T.A. Conference held in Nice, airlines operating over the North Atlantic agreed to reduce fares during the winter months, starting from next October and finishing on April 30th, 1950. Tickets will be made valid for 60 days and the reduction will be one of 25 per cent over the normal fare, making the reduced fare for the return journey between London and New York £115 17s and the London to Montreal return £111 4s.

Similar reductions are being made in association with B.E.A., Qantas and South African Airways on routes in the eastern hemisphere. B.O.A.C. anticipate that their 60-seater Stratocruisers will start operations on the London to New York service during the period for which the reduced fares are in force.




*HOLIDAY RUSH: Included in the measures to deal with heavy bookings for travelling between London and Paris during the height of the holiday season is the introduction by Air France of DC-4s seating 44 passengers. One of the company's aircraft of this type is seen taxying out at Orly Airport.*

## SABENA FINANCES

SABENA capital has been increased by 20,000,000 Belgian francs to 300,000,000 Belgian francs, half of which has been jointly subscribed by the State and the Belgian Congo (each taking 70,000,000 francs) and the other half by private shipping and colonial interests. The Board, on which the Government and private interests are equally represented, now number 14.

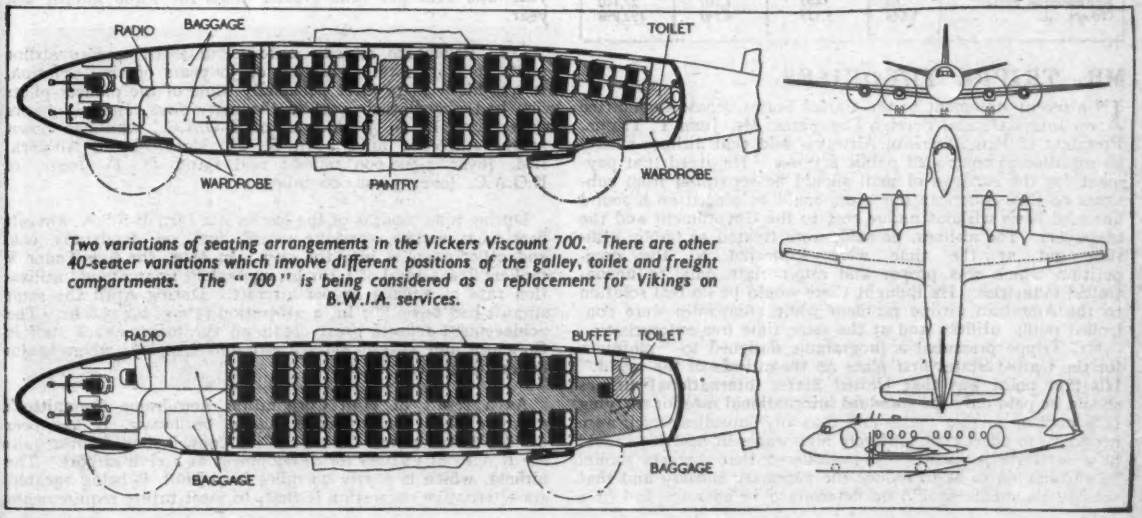
M. Gilbert Perier, formerly president and managing director, who is also president of I.A.T.A., has been reappointed president; Baron Alberic-Emile Rolin is again vice-president; and M. Gaston Claeys, former general secretary of the Ministry of Transport, has been appointed managing director.

The company enjoys the exclusive right of scheduled air transport between Belgium and the Belgian Congo and, with minor modifications, similar rights within Belgium and the colony.

## MINISTER'S POWERS

RESIDENTS in the vicinity of London Airport were disturbed by a recent formal Notice of Intention by the Minister of Civil Aviation foreshadowing an Order to take certain powers which would include the right to demolish buildings within five miles of the Airport.

The wording of the Notice was dictated by the provisions of the Act, which, however, contains safeguards against abuse of the Minister's powers, including a local public inquiry to hear objections before the Order is laid before Parliament. The Ministry has now said that no houses will be demolished under the Order, at least until the Airport is expanded north




*Two variations of seating arrangements in the Vickers Viscount 700. There are other 40-seater variations which involve different positions of the galley, toilet and freight compartments. The "700" is being considered as a replacement for Vikings on B.W.I.A. services.*

## Civil Aviation News . . . . .

of the Bath Road, which will not be until 1953 at the earliest.

It is understood that the primary object of the Order is to limit the height of structures in the immediate approaches to the runways in conformity with international practice and in the interests of safety. It will also enable the Minister to require tall trees to be lopped where necessary and to close private rights of way.

### CHANNEL TRAFFIC

TRAFFIC between France and England reaches its climax during the holiday months of July and August. Air France measures to deal with the increase start to-morrow, July 15th, with certain services operated by 44-seater Skymasters in place of the usual 33-seater Languedocs. Some week-end services between London and Paris will use Orly instead of Le Bourget, the former being normally used by Air France on long-distance flights only.

On July 27th a new daily service will be introduced to the Riviera, arriving in Nice at 1525 hr and connecting with road services to Juan-les-Pins, Cannes and Monte Carlo. The return aircraft will leave Nice at 1620 hr.

On July 29th Air France and B.E.A. will introduce special London to Paris excursion services (30-day return fare, £10) for those willing to travel between 2200 and 0800 hr.

### FEBRUARY AIRPORT ACTIVITY

THE total number of passengers embarked or disembarked during February on scheduled air services and international charter flights at airfields reporting to the Ministry of Civil Aviation totalled 76,177. Nearly 3,000,000 lb of freight and 1,500,000 lb of mail were also handled. Of 23,419 take-offs and landings, 8,614 were on air transport services.

At Prestwick, of the 453 aircraft movements, the majority were trans-Atlantic and continental flights, on which 3,917 passengers were in transit.

Aircraft movements in column (a) of the accompanying table are for scheduled services and international charter flights only; in column (b) are movements of all other aircraft. Figures given in columns (c) and (d) are for passengers and freight on scheduled services and international charter flights only.

| Airport | Aircraft Movements (a) | Aircraft Movements (b) | Passengers In and Out (c) | Freight (lb) In and Out (d) |
|---|---|---|---|---|
| Aberdeen (Dyce) ... | 249 | 860 | 566 | 9,815 |
| Belfast (Nutts Corner)... | 300 | 18 | 4,496 | 58,181 |
| Blackbushe ... ... | 148 | 301 | 1,749 | 174,265 |
| Bovingdon ... ... | 105 | 781 | 618 | 398,760 |
| Inverness (Dalcross) ... | 232 | 16 | 1,129 | 18,038 |
| Isle of Man (Ronaldsway) | 205 | 53 | 1,655 | 13,184 |
| Kirkwall (Hatston) ... | 502 | 11 | 1,103 | 15,209 |
| Liverpool (Speke) ... | 313 | 259 | 3,352 | 72,615 |
| London ... ... ... | 1,425 | 517 | 18,771 | 1,193,236 |
| Manchester (Ringway) | 297 | 687 | 2,455 | 113,425 |
| Northolt ... ... | 1,876 | 368 | 23,330 | 610,956 |
| Prestwick ... ... | 453 | 335 | 5,485 | 67,591 |
| Renfrew ... ... | 570 | 115 | 5,115 | 38,486 |
| Southampton (Eastleigh) | 234 | 922 | 1,079 | 2,453 |
| Southampton Water ... | 60 | 497 | 1,107 | 27,110 |
| Others ... ... ... | 1,645 | 9,115 | 4,147 | 132,998 |

### MR. TRIPPE THEORISES

IN a recent statement to the United States Senate Committee on Interstate and Foreign Commerce, Mr. Juan T. Trippe, President of Pan American Airways, said that airlines should be regarded as controlled public utilities. He urged that payment for the carriage of mail should be separated from subsidies so that American operators could be placed on a sound financial basis without undue cost to the Government and the taxpayer. The airlines, he said, were treated as public utilities, but at the time were subjected to the competition which was proper and appropriate only to uncontrolled industries. He thought there would be no real solution to the American airline problem while companies were controlled public utilities and at the same time free enterprises.

Mr. Trippe presented a programme designed to "maintain for the United States first place on the airlines of the world." His first point was that United States international airlines should be paid only the standard international rate for carrying U.S. mail on foreign routes and that any subsidies which were necessary to offset comparatively high wages in America should be a separate payment. He considered that mergers should be encouraged so as to reduce the necessary subsidy and that subsidy payments should be determined in advance and in a manner designed to restore incentive. His final point in the programme was that the Government should endorse the institution of low-cost tourist fares to stimulate travel abroad.

In order to separate direct subsidy from subsidized mail payments, said Mr. Trippe, airlines should be paid at the rate set by the Universal Postal Convention for the most important routes on which American operators met foreign competition and over those routes on which the U.S. was paying foreign operators for carrying American mail when there was already an American operator. He suggested that the subsidy should be adjusted to make up the difference between the wages of American airline employees and the lowest rate paid by foreign operators on the same route. In effect, such a scheme would constitute a subsidy to American workmen employed in international aviation. He further suggested that the Civil Aeronautics Board should be given authority to grant additional subsidy to offset the effect of direct financial aid by foreign Governments to their own airlines. That suggestion would, in effect, cover the cost of opening up prestige routes and those which would be in the national interest but would have a low traffic potential. In suggesting that the amount should be determined in advance, Mr. Trippe said the present system of fixing rates retrospectively had imposed a cost-plus philosophy which was damaging on every count.

*MILEAGE MILLIONAIRES: At a recent lunch, as related below, Lord Pakenham entertained three pioneer airline pilots (left to right): Capt. E. S. J. Alcock of B.O.A.C., Mr. R. H. McIntosh of Airwork, Ltd., and Capt. O. P. Jones of B.O.A.C.*

## BREVITIES

B.O.A.C. has announced that for the first five months of this year receipts in the United States for transatlantic passenger fares amounted to £100,000 more than in the corresponding period of 1948. Cargo receipts were £62,500 more. The total payload flown across the Atlantic during May this year was 12.8 per cent greater than the same month last year.

* * *

Lord Pakenham recently entertained three veteran airline pilots to mark the celebration of 30 years of civil aviation. It was his wish to meet personally some of the pioneer pilots who had played their part in the early days, and his guests were Capt. E. S. J. Alcock, of B.O.A.C., who has flown nearly 4,000,000 miles; Mr. R. H. McIntosh, of Airwork, Ltd. (over 3,500,000 miles); and Capt. O. P. Jones, of B.O.A.C. (over 3,000,000 miles).

* * *

During nine months of the Berlin Air Lift, B.S.S.A. aircraft flew 2,021 sorties, carrying petrol, fuel, oil, foodstuffs, coal and other supplies into the city. In May, the five Tudor V tankers flew a total of 1,161 hr, equivalent to an annual utilization rate of 2,786.4 hr per aircraft. During April the same aircraft had flown 867 hr, a utilization rate of 2,433.6 hr. The achievement reflects great credit on the maintenance staff in Germany and at London Airport and Langley, where major overhauls are carried out.

* * *

As a result of Hull Corporation Aerodrome Committee's estimate that running costs would be heavy, it has been decided to recommend that the City Council should not acquire the R.A.F. at Catfoss for development as a civil airport. The airfield, which is nearly 20 miles from Hull, is being vacated. An alternative suggestion is that, to meet future requirements,

suitable spaces within the city should be reserved as landing areas for helicopters in order to connect Hull with adjacent terminal airports.

* * *

Expenditure on the development and maintenance of Shannon and Dublin Airports up to March 31st this year was £4,527,000, of which £2,245,000 had been spent on the former. The gross revenue from Shannon amounted to £425,000 and from Dublin £139,000.

* * *

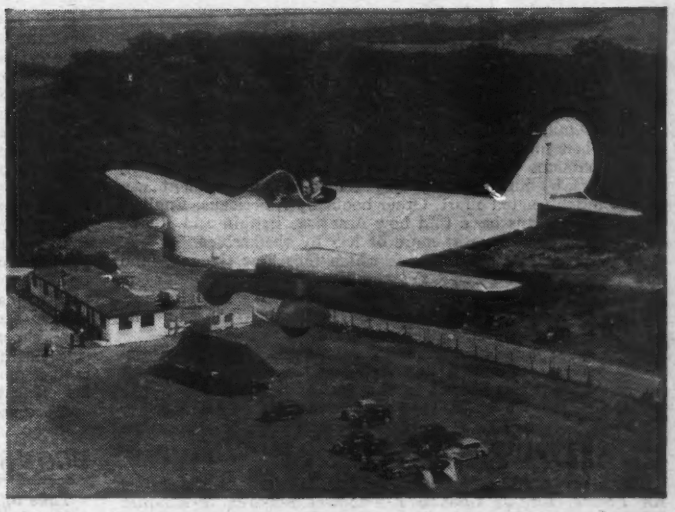
A recent route-analysis of Aer Lingus traffic showed that the increase, as compared with last year's figures, was greater on the Glasgow service than on the routes to other provincial cities. During June the company carried 19,249 passengers. In May, cargo traffic was a record, the 120 tons carried constituting an increase of 75 per cent over the May, 1948, total.

* * *

Since B.S.A.A. opened their route between Miami and Nassau in February, 1948, nearly 8,000 passengers have been carried, earning $165,500. Peak season on this route is January-March, and in those three months this year 1,200 dollar-paying passengers flew by B.S.A.A.—about 70 per cent of the total number of passengers carried on the route. During the busy season, the normal service of six return flights a week (by Avro Yorks which leave Miami in the early morning and return in the evening) was increased to fourteen.

* * *

Night-flying restrictions in the Middle East have been lifted, and on its Constellation service from Sydney, B.O.A.C. has introduced night stops at Karachi and Cairo in place of the present long halt at Karachi and the night stop at Rome. Arrival time in London will be 2 hr 35 min later, but passengers will make three complete night stops during the four-day journey. The outward routine is unchanged, with night stops at Cairo and Singapore.



*FAIREY GODFATHER: As reported on p. 58, the Royal Naval Flying Club has recently re-opened at Gosport, using two Tipsy light aircraft presented by Sir Richard Fairey. One of the two is seen here being demonstrated by F/L K. W. Birt, the chief instructor, at the inaugural ceremony.*

On June 30th, the G.C.A. system at London Airport completed two years of operation under M.C.A. control. A total of 5,161 approaches was made, of which 3,020 were optional and 2,141 practice. All the 17 companies operating at the airport use G.C.A. either as a primary aid or as a monitor for I.L.S. approaches. The system is also installed at Northolt, Prestwick, Speke and Nutts Corner where, as at London Air port, it is manned throughout normal working hours.

# FROM THE CLUBS

MEMBERS of the Lancashire Aero Club broke all their previous records in May by logging 131 hours' flying and, although the exact figures are not yet known, it is thought that in June some 150 hours were flown.

Work on the new clubhouse at Barton was recently started, and volunteers are being recruited to assist in decorating the interior, and so to reduce the amount of the loan required from the Kemsley Trust. The target of £250 for the building has not yet been reached, but at the end of June the fund amounted to £199 8s.

* * *

AT the end of June, when 17 members were under instruction, membership of the Strathtay Aero Club included 62 holders of current licences, 14 of whom qualified during the previous twelve months, in which period the flying-time amounted to 635 hours. In co-operation with Airwork, Ltd., pleasure flights were organized from the centre of Lanark Racecourse during the Lanimer Day celebrations on June 9th; the weather was good and some 160 passengers were carried. The Royal Highland Show at Dundee brought record attendances and many chartered aircraft visited Perth Airport at Scone.

* * *

SINCE the South Coast Flying Club reduced flying fees a month ago there has been a marked improvement in flying hours and also in membership. Joy-riding has been encouraged by advertising and other means, on the grounds that each passenger can be regarded as a potential club member. The club makes a feature of organizing parties for aviation and other events, and plans are well in hand for visiting the Gatwick show on July 23rd. Preparations are also being made for a coach to take a party to Goodwood Races on Thursday, July 28th, and to fly another party to the National King's Cup Race, for which visit the fare will be £6 5s per head, including lunch. A party of members and private-owner members, including Capt. Duncan Davis (chairman), flew to Deauville for the recent rally.

* * *

THIS year's air races at Thruxton, near Andover, are to be held on Sunday, August 21st, on lines similar to those of the 1948 event. Interspersed with one-class scratch races for Austers and Magisters, and an open handicap race to Totland Bay, Isle of Wight, will be a varied assortment of flying displays and competitions. The support of the Royal Air Force is expected in the form of high-speed aerobatics by Spitfires and Vampires, and detachments of the Army will, it is hoped, give airborne demonstrations, including a glider "snatch take-off." Air Service Training, Hamble, will contribute to the display.

Competitions will include height-judging, speed-judging and aerial "red-tape" cutting. The main event will, of course, be the race to the Isle of Wight, for which, it is understood, a really impressive silver cup is being offered as first prize.

The meeting is being organized by the Wiltshire School of Flying, Ltd., in conjunction with the Wiltshire Flying Club and the Royal Artillery Aero Club, and the band of the Royal Artillery will be in attendance throughout the afternoon. The programme starts at 2 p.m. and admission will be 1s 6d.

*SOUTH AFRICAN RALLY: Spectators at the recent Pietermaritzburg air rally included (left to right), Mr. Thompson of Johannesburg, Mrs. Wyn Armitage, secretary of the 'Maritzburg Aero Club, and Colonel A. Malcolm Broad, Chairman of the Aero Club of South Africa.*

## BOOKS REVIEWED

### "IKE" on AIR POWER

*"Crusade in Europe," by Dwight D. Eisenhower. William Heinemann, Ltd.; 582 pp.; price 25s.*

IN the last four years we have had a succession of books by air marshals explaining how air power won the last war, and books by admirals claiming that air bombardment was just so much wasted effort. Other books by Americans, Englishmen and Russians have told how America, Britain and Russia respectively won the war more or less by themselves.

Now at last, we have a book which tells how the sea, land and air forces of all the Allies *combined* to achieve victory in the major campaigns in North Africa and Western Europe. *Crusade in Europe* is a notable book, written by the man who did the combining—Dwight Eisenhower.

Supreme Commander in both campaigns, General Eisenhower leaves no doubt of his views on the importance of air power in modern warfare. In Chapter II he writes: "Already (by May, 1942) we had learned the lesson that, while air power alone might not win a victory, no great victory is possible without air superiority." The rest of the story shows that he never forgot that lesson.

There are sources of references to the work of the Allied Air Forces, for, as General Eisenhower remarks in Chapter XXIII: "The European campaign almost daily developed new and valuable uses for air power." We can read how, many times, aircraft played a major part in winning important land battles, how they occasionally made mistakes, and how the enemy took advantage of their grounding by bad weather to launch his final offensive in the Ardennes in December, 1944.

*Crusade in Europe* is far more than just a chronicle of battles fought and won. It is a readable and human story, studded with intimate pen-portraits of Allied soldiers and statesmen. It is worth reading if only because it sets the importance of air power in correct perspective against the background of the campaigns as a whole. J. W. R. T.

### BOMBS v. INERTIA

*"Vision Ahead," by Air Commodore P. Huskinson, C.B.E., M.C., with forewords by Lord Beaverbrook, Marshal of the Royal Air Force Lord Tedder and General of the Army H. H. Arnold, U.S.A.A.F. Werner Laurie, London; price 11s 6d.*

THERE have been plenty of Second World War books written by fighter pilots, rather fewer by those who fought with Bomber and Coastal Commands, and a goodly selection by escapees, Intelligence Officers and various others. Too few have been produced by the specialists—the Engineer Officers, scientists and so forth concerned with the development and use of particular offensive or defensive weapons. To a certain extent this is a natural result of the security measures which even now cloak some aspects of wartime scientific development; but enough has been revealed at odd times and places to fill several good books, and A. Cdre. Huskinson has written one of them.

From the end of the 1914-18 war, in which he served with distinction in No. 2 Squadron, the author was an armament specialist, with bombs as his particular *métier*. His story of the inter-war years is a record of the painfully slow development of R.A.F. armament in the face of Treasury tight-fistedness and military orthodoxy, for the air arm was treated as a sort of poor relative; though the Ordnance Board, which supervised the production of explosives and the things to contain them, was theoretically an inter-Service body, in practice it had an Army officer at the head of every department. It was only through the *enfant terrible* tactics of Huskinson and a few others (they did things first and asked permission afterwards), backed by senior officers such as Air Commodore (now Lord) Dowding and Sir Philip Game, that R.A.F. armament, and armament training, reached the level which it did when war broke out in 1939; and even so that level, as many will remember, was a pitiably low one.

In 1918, our bombs were filled with a mediocre explosive known as amatol. In 1942, says A. Cdre. Huskinson, we were still using it, in spite of the fact that the immensely more powerful R.D.X. had been successfully produced by the research department at Woolwich three years before the outbreak of war. An accident had occurred in the building in which the experiments were conducted, destroying the apparatus and killing several workers; R.D.X. development was immediately suspended for eighteen months. R.A.F. bombs were greatly inferior to those being used by the Germans, and Huskinson, as vice-president of the Ordnance Board, resolved that the lost ground must be recovered, and recovered quickly. One of his moves was the formation of the Static Detonation Committee, a board of distinguished scientists who, "arguing in their own language with the scientific experts in the Research Department," were soon able to speed up every aspect of bomb development.

There is a sinister fascination about the Air Commodore's accounts of some of the Committee's experiments—for instance, the ultra-slow-motion films which show a statically detonated bomb to swell to nearly twice its size, the casing stretching like rubber, before fragmentation takes place.

Bomb disposal, the development of R.P. armament, the preparation of the Möhne Dam weapons, anti-submarine measures; all these varied aspects of scientific development find a place in A. Cdre. Huskinson's book. Reading this modest account of completely selfless efforts, one is not, somehow, surprised to find a horrible tragedy—the loss of his eyesight in the bombing of London—treated by him as little more than a minor irritant which caused him some inconvenience in his office work. Major irritants, to him, were inertia and incompetence at all official levels. R. E. C.

## BOOKS RECEIVED

*Take off!* By Robert Duce. Independent Press, Ltd., 6s.

*Model Glow Plug Engines*, by C. E. Bowden. Percival Marshall, 3s 6d.

*Wireless for Beginners*, by C. L. Boltz. Harrap, 7s 6d.

*Le Cabotage Aerien*, by Dr. Alex Meyer. Les Editions Internationales, Paris.

*Electricity*, by C. L Boltz. George G. Harrap, 8s 6d.

*Streamline Flow*, by H. F. P. Purday. Constable, 18s.

*"The Aeroplane" Directory of British Aviation.* Published by the English Universities Press, Ltd., for Temple Press, Ltd., 10s 6d.

*The Technology of Aluminium and its Light Alloys* (Third Edition), by Dr. Ing. Alfred von Zeerleder. High Duty Alloys, Ltd., £1 1s.

*Guide to Europe (prepared by New York Herald-Tribune).* Seymour Press, Ltd., London, 4s.

*British Standards Institution*—1949 *Yearbook.* B.S.I., London. Price 5s.

*Wireless and Electrical Trader Year Book*, 1949. Trader Publishing Co., Ltd., London. Price 10s 6d.

*Aluminium in Service.* Aluminium Development Association, London.

### R.Ae.C. AVIATORS' CERTIFICATES

IN pre-war days *Flight* periodically published the official lists of Aviators' Certificates issued by the Royal Aero Club. It is now possible to resume this feature, and below are details of Certificates issued (up to June 6th) since the new licensing regulations came into force on April 1st:—

| No. | Name | Club or School | Date |
|---|---|---|---|
| 25,988 | Richard William Hewett ... | 21 E.F.T.S. ... ... | 26.4.49 |
| 25,989 | David Nursaw ... ... ... | Luton Flying Club ... | 26.4.49 |
| 25,990 | André Bercut ... ... ... | Current French Licence | 2.5.49 |
| 25,991 | Jean Pierre Facquier ... ... | " | 2.5.49 |
| 25,992 | Gordon Banner ... ... ... | Qualified Service pilot... | 2.5.49 |
| 25,993 | Frank Gordon Doswell ... ... | " ... | 2.5.49 |
| 25,994 | Anthony Gerald Lawrence Huggins ... ... ... ... | " ... | 5.5.49 |
| 25,995 | Edward Harold Orchard ... | " ... | 5.5.49 |
| 25,996 | Edward Samuel Kirvan ... | " ... | 5.5.49 |
| 25,997 | Dennis Cash ... ... ... | " ... | 5.5.49 |
| 25,998 | Robert Stanley Eyre ... ... | " ... | 9.5.49 |
| 25,999 | Trevor Nelmes Silk ... ... | " ... | 9.5.49 |
| 26,000 | Maurice Clarke ... ... ... | " ... | 9.5.49 |
| 26,001 | Roy George Archer ... ... | " ... | 9.5.49 |
| 26,002 | Leslie Ronald Gerald Swain ... | Current "A" Licence... | 12.5.49 |
| 26,003 | Honore Louis Creuser ... ... | French Licence ... ... | 14.5.49 |
| 26,004 | Pierre Paul Larrayadieu... ... | " ... ... | 13.5.49 |
| 26,005 | André Heligoin ... ... ... | " ... ... | 13.5.49 |
| 26,006 | William Arthur Bower ... ... | Current "A" Licence... | 13.5.49 |
| 26,007 | Frederick Kenneth Mitchell ... | Qualified Service pilot... | 25.5.49 |
| 26,008 | Duncan Brown Ireland ... ... | " ... | 25.5.49 |
| 26,009 | Vlassis Pylarinos ... ... ... | Air Service Training, Ltd. | 25.5.49 |
| 26,010 | Joseph Leonard Shield ... ... | Qaulified Service pilot... | 26.5.49 |
| 26,011 | Geoffrey John Hill ... ... | " ... | 26.5.49 |
| 26,012 | Denis Sydney Corser ... ... | " ... | 26.5.49 |
| 26,013 | Stanley J. Hubbard ... ... | " ... | 26.5.49 |
| 26,014 | Theodore Rajfeld ... ... | Denham Aero Club ... | 30.5.49 |
| 26,015 | John Rowling Eric Driscoll ... | Qualified Service pilot... | 30.5.49 |
| 26,016 | Brian Simpson Armitage ... | " ... | 2.6.49 |
| 26,017 | Hugo Torben Grut ... ... | Exeter Aero Club ... | 2.6.49 |
| 26,018 | Peter Charles Nesbitt Poolman... | Qualified Service pilot... | 2.6.49 |
| 26,019 | Ronald Gant ... ... ... | N. of Ireland Aero Club | 3.6.49 |
| 26,020 | Justo Ricardo B. del Carril ... | Denham Aero Club ... | 7.6.49 |
| 26,021 | Edward James Moloney ... ... | Cardiff Aero Club ... | 7.6.49 |
| 26,022 | Pierre Marcel Gallay ... ... | B.E.A. Helicopter Unit ... | 7.6.49 |

# HERMES TRIALS

OPERATIONAL trials of the Handley Page Hermes IV will start at Hurn as soon as the first example is delivered to the B.O.A.C. Development Flight. The route-flying programme has not been disclosed, but a probable choice for the first proving flight would be to West Africa; further trials are likely at a later date, in the Caribbean area. After the first flight of the Hermes IV last September, forecasts of early delivery were made which have since proved to be somewhat optimistic, but production is, nevertheless, well advanced. Constructors' and purchasers' trials at Boscombe Down are nearly complete and airworthiness trials are under way. A provisional C. of A. will suffice for the series of operators' trials.

The Hermes embodies features associated only with a truly modern airliner; some of these, unfortunately, presented initial problems, and late delivery of certain raw materials and items of ancilliary equipment have contributed to delays. By agreement with the Corporation and with the Ministry of Supply, however, the delay has been accepted to ensure that the first post-war British landplane to fly with B.O.A.C. shall not suffer set-backs such as were experienced with other types after operational flying had started.

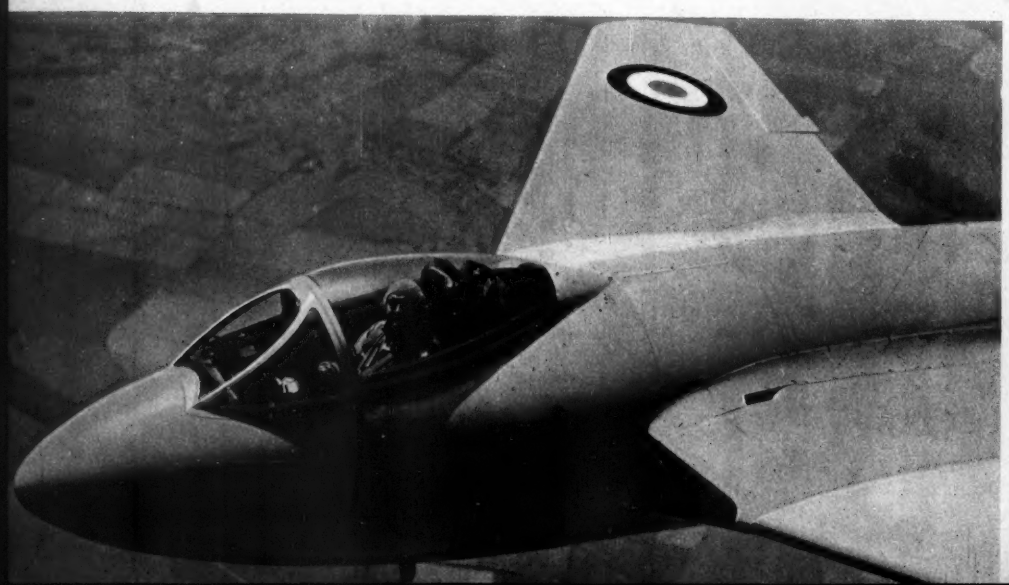
The inverted T which can be seen on the side of the fuselage in the accompanying *Flight* photographs of the Hermes IV is to assist the photographing of take-off and landing.

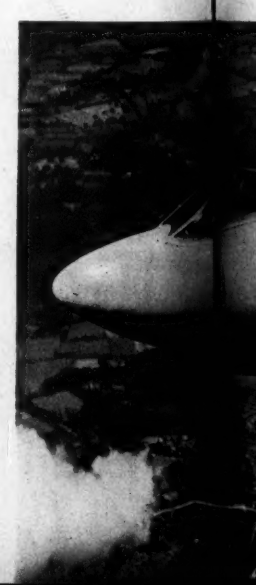
# PROTOTYPE PORTRAITURE

ONLY the exceptional skill and patience of our test pilots make possible such pictures as these of S/L. Wade flying the swept-wing Hawker P.1052. As far back as 1919 *Flight* used air-to-air photography to portray aircraft, being the first journal in the world to do so. It is an art which has become more and more difficult as speeds have increased. The latest jump, caused by the coming of jet propulsion, has made it almost impossible to find a suitable photographic aircraft other than a two-seat jet such as the Meteor 7.

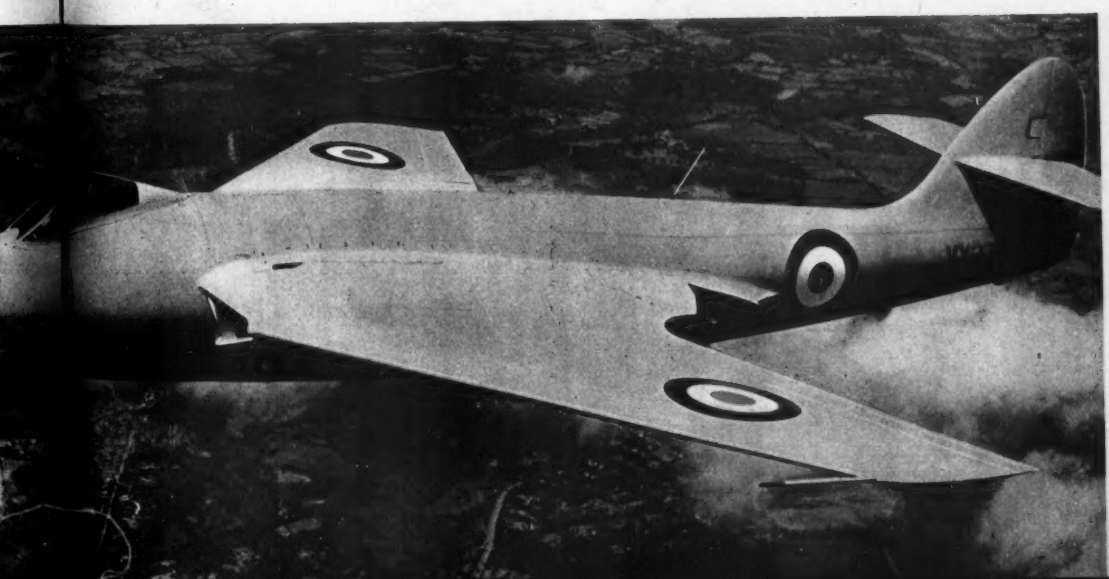
It is often the case that the top speed of the photographic aircraft is but little above the stalling speed of the prototype being photographed, and it is only by virtue of the test pilot's skill and the responsiveness of his controls that steady formation and pleasing attitudes can be maintained while the cameraman makes his pictures.

J. Y.





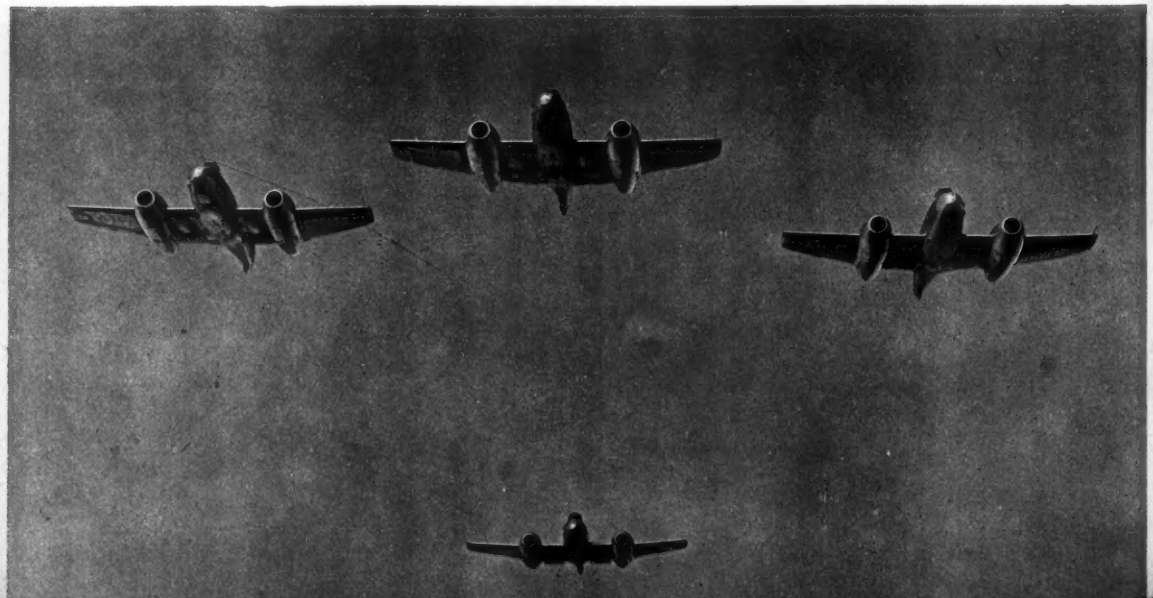
VX279



# FOUR IN HAND

TO the proficiency of Tangmere Meteor pilots and the deft handling of an Air Ministry camera by S/L. P. R. Parker credit is due for these spirited studies. It will be observed, in the view of the approaching formation, that the fighters have their dive-brakes extended to decelerate to the more modest pace of the photographic Lincoln.

Some especially fine performances by Meteors were recorded during the recently completed Exercise *Foil*. Londoners will not soon forget the heartening spectacle of these—the fastest-climbing intercepters in service—harrying a stream of U.S.A.F. Superfortresses on the afternoon of Sunday, July 3rd. Contrails delineated the battle.



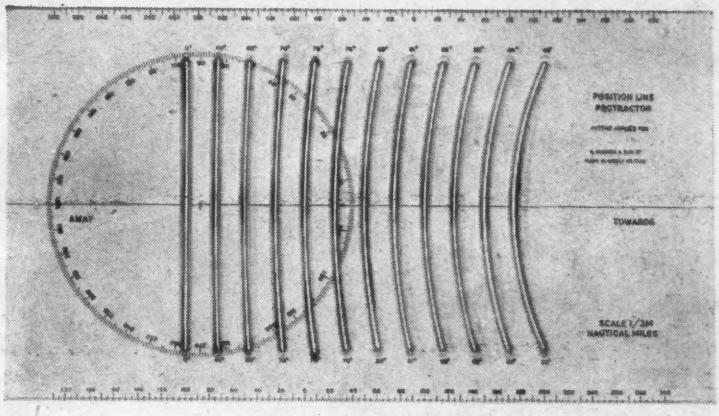
# Astronomical Navigation

## *Eight Papers by Specialists in the Art*

ENTITLED *Astronomical Navigation in the Air—a Discussion on Methods to Produce Speed and Accuracy*, an important symposium was held recently in London by the Institute of Navigation, with the Astronomer Royal, Sir Harold Spencer Jones, F.R.S., in the chair. Summaries of the papers read appear below:—

*Requirements for Astronomical Navigation* (J. B. Parker, read by D. O. Fraser).—The requirements for aids to air navigation were examined, and the suggestion made that they fell into two distinct categories: (a) general aids for controlling passage safely and efficiently; (b) more accurate and completely universal aids for specialized problems, such as homing and the maintenance of traffic patterns.

It was argued that astronomical navigation cannot fulfil the requirements of a type (b) aid and should, therefore, be considered solely in terms of the requirements for type (a); a consideration of these requirements suggested that a 95 per cent fixing error of 10 nautical miles is sufficient.




*The Hughes position-line protractor which was the subject of Mr. P. F. Everitt's paper.*

The paper advocated a simplication of the *Air Almanac* and/or reduction tables at the expense of accuracy, provided that the errors, when combined with those of the observer and his equipment, fell within the tolerable 95 per cent error.

*Use of Astro in Fast Aircraft* (A. H. Jessell).—This paper discussed in general terms the practical requirements of high-speed flight. The principal weakness in astro was considered to be the time needed to take and plot a fix; unless this time could be much reduced it was unlikely that much use would be made of astro in fast, high-flying aircraft.

Astro, like any other navigation aid, could provide information either to the navigator or to the pilot, and possible developments were considered under these two headings. In the first case, some sort of sextant was required, and features of such instruments were discussed by the speaker in the light of the requirement for rapid fixing in pressure-cabin aircraft. The next requirement was for more rapid methods of reduction and plotting. A certain amount of accuracy of reduction methods could be sacrificed to this end, without reducing the overall accuracy of astro fixing. The most direct method, perhaps, was to use star curves, on a reduced scale.

In the case of astro as an aid to the pilot, the most likely development was some form of automatic astro compass.

### Altitude-Azimuth Almanac

*Suitability of an Altitude-azimuth Almanac* (D. H. Sadler).—In this paper a number of possible methods of combining the almanac and reduction tables were examined. The conclusion reached was that none of them offered any substantial advantage over the present methods and was worth developing in detail. The only exception was a permanent table for the sun; this table was considered to be of some merit in itself and worthy of further investigation, though it still left unanswered the problem of the moon and planets, and it is probable that their inclusion would make it desirable to have a special method for the sun.

*Methods of Plotting and Reduction* (P. F. Everitt).—This paper described a position-line protractor designed for use with long intercepts. The protractor has been constructed on the horizontal stereographic projection to a scale of 1:3,000,000 and provides altitude-circle slots, through which a pencil can be run, uniformly spaced at right angles to a central line of azimuth. The protractor can be used on a horizontal stereographic projection or, without appreciable error, on the Lambert Conformal; it cannot be used with the Mercator projection.

One suggested advantage of the protractor is that the "mesh" of altitude-azimuth tables such as A.N.T., H.O. 214, and H.O. 249, can be opened from one degree to three, thus achieving a ninefold reduction in bulk. It was also suggested that the pre-computation of altitudes and azimuths could in most cases be done by an operations staff on the ground, the navigator making his observations within five minutes of the given time and correcting for run and difference of time.

*An Altitude-azimuth Sextant* (R. Genty—read by Prof. A. J. Bastien).—A method was described by which the spherical astronomical triangle is solved using the altitude, azimuth and declination of a star. Altitude and azimuth are measured simultaneously with a sextant measuring azimuth from a reference star (Polaris or β Hydrae Male). Using this method, a single twin-star observation allows a fix to be obtained in terms of its geographical co-ordinates by means of special tables and certain additions and subtractions.

*Air Navigation by Zenith Photography* (R. d. E. Atkinson and E. Brett Hilder).—This paper showed that provided a camera can be suitably stabilized in an aircraft, zenith photography may be a rapid and sufficiently accurate method of astro navigation, with the advantage that a single observation gives a fix instead of a position-line.

A method of stabilizing the camera was outlined, in which two equal gyroscopes rotate at the same speed in opposite directions, and are connected by a linkage so that the mid-point between them is stationary when they precess by equal and opposite amounts. The resulting photograph is fitted to a star map by a procedure which ignores distances and relies only on directions. Astronomical precession is applied to the fix, not to the individual stars; corrections both for precession and for map distortion are made by simple graphical methods.

*Instrumental Reduction* (A. J. Bastien).—The speaker described the principles of an instrument which would record continuously and instantaneously the latitude and longitude of an aircraft in flight.

*The Vertical Datum* (Francis Chichester).—Some suggestions as to the accuracy required from astronomical navigation in the future were put forward in this paper. In particular it was argued that a relatively high order of accuracy would be required for the determination of wind effect over short periods for the purpose of plotting pressure gradients in the vicinity of the aircraft.

It was concluded that the principal failings of astronomical navigation at the moment were due to the vertical datum in use.

### THE DISCUSSION

The papers were summed up by Capt. R. C. Alabaster, of British South American Airways, and Mr. W. A. W. Fox, of the Ministry of Supply, gave a valuable summary of the different methods proposed to define the problems of the vertical by gyroscope. In discussion, some further useful contributions were made, notably by W/C. E. W. Anderson, of Shawbury, who suggested that the pilot of a modern fast aircraft wanted to know not so much *where* he was as what he ought to do about it; he felt that plotting methods were now rather beside the point, and suggested the tabulation of altitudes and azimuths of the best celestial bodies available for observation in specific areas of the world.

The papers read at the symposium are to be published *in extenso* in the October issue of the *Journal of the Institute of Navigation*. The offices of the Institute are at the Royal Geographical Society, 1, Kensington Gore, London, S.W.7.

*It will be gathered from this aspect that the La-11 is a small fighter with a large engine. The object attached to the windscreen is thought to be a camera gun. Note how the breech of the starboard synchronized gun has necessitated a bulged coaming.*

# LAVOCHKIN'S ELEVENTH

## *Features of Russia's Newest Piston-engined Fighter : All-metal Construction : Three Synchronized Guns*

THE findings of Swedish experts who examined the Soviet fighter crash-landed near Tullinge on May 18th are, as the Americans have it, "classified"—which means that they are not being made public; but the newly received photographs on this page are illuminating.

That the designation La-11 is correct for this all-metal aircraft, designed by Lavochkin, is confirmed by an inscription on the port side of the cowling; the type of engine, however, is variously reported as a 14-cylinder radial of the ASH-82 series (1,850 h.p. approx.) and an 18-cylinder AS-90 of 2,100 h.p. or more. As on the Fw190 and Hawker Fury, the exhaust stubs are bunched together and discharge through channels in the fuselage sides. The main cowling panels are secured by metal straps. Segmental intakes are located above and below the spinner, and there appears to be a retractable oil-cooler well aft beneath the fuselage. Photographs of La-11s in flight certainly show a prominent object in this position.

Three synchronized guns—reported by the Swedish Press to be of 20 mm calibre—are mounted unsymmetrically and fire through ports in the leading edge of the engine cowling. The breeches of two of these guns have necessitated bulges in the fuselage panelling forward of the cockpit. There is reason to believe that the object mounted externally above the bullet-resisting windscreen is a camera gun and not, as has been reported, a periscopic gunsight; a reflector sight is fitted internally. The pilot is protected by a sheet of back armour, but his field of view appears to be much more restricted than that obtainable from the Fury, with its bubble canopy. There is no

*The large radial engine and low-sited cockpit, lacking the clear-view bubble canopy now standard on truly modern fighters, must seriously restrict the pilot's field of view.*

fall-away of the top fuselage line in front of the cockpit, and forward view, especially on the ground and during climb, must be poor.

The plan form of the wing differs from that of the earlier La-7 (of wooden construction) in being relatively square cut at the tip. Split trailing-edge flaps are fitted inboard of the ailerons, which carry small auxiliary surfaces. The tailplane is of rather large span, and the elevators are inset many inches from the square-cut tips. The port elevator carries a trim tab. All three wheels are completely retractable.

The approximate span is reported from Sweden to be 32ft and the length 28.5ft. No estimate of weight has yet been advanced, but in view of the light armament and, it may be supposed, none-too-elaborate equipment, the figure is likely to be fairly low. Certainly the maximum speed should be appreciably higher than the 400 m.p.h. suggested by one Swedish authority. Experimental variants are believed to have auxiliary rocket power.

In common with other types of Russian single-seat piston-engined fighters, the La-11 should be very manœuvrable, though hardly more so than the Fury with its extremely effective spring-tab ailerons. In range, adaptability and all-round flying qualities the Fury should be the superior of the Russian.

*Visible here are ports for two of the three synchronized, fuselage-mounted guns—reported to be of 20 mm bore.*

# C. F. S. REUNION

MARSHAL OF THE ROYAL AIR FORCE SIR JOHN SALMOND was the guest of honour at Little Rissington last Friday evening when the Central Flying School held its annual reunion dinner. He and Air Chief Marshal Sir Arthur Longmore are the only surviving flying instructors who were with the unit in 1912, the year of its formation. After the dinner he treated the company to a vivid description of flying in 1912—with a maximum of 50 h.p., no throttle, no reliability and not much control!

The chairman for the evening was Air Chief Marshal Sir James Robb, who was a pupil at C.F.S. in 1916, Chief Flying Instructor in 1926 and Commandant in 1936. In a brief speech to introduce the present Commandant, G/C. Stevenson, he also paid a gracious tribute to that almost legendary figure of C.F.S., Col. Smith-Barry, who died recently. The patter and system of flying training evolved by Smith-Barry in the 1914-18 war remain basically the same to-day.

G/C. Stevenson—who, some of our older readers will remember, used to perform the inverted formation event with Scragg and Mermagen at pre-war R.A.F. displays at Hendon—regretted what he called the loss of that 20 minutes' flying between breakfast and the start of the day's flying instruction—the 20 minutes when C.F.S. instructors used to do a little "light-hearted flying." Flying to-day appears to be a trifle over-regimented, but he hoped the "20 minutes" would come back again before long.

Before sitting down, G/C. Stevenson gave the following figures for instructors passed out since July, 1948: Royal Navy, 37; Army, 6; Royal Air Force, 263; Royal Indian Air Force, 16; Royal Pakistan Air Force, 5; Belgian Air Force, 2; Royal Australian Army, Royal Pakistan Army, U.S.A.F., Irish Free State Air Corps and Siamese Air Force, 1 each; total, 334. He also expressed pleasure at seeing in the list of pupils such names as Salmond and Slessor—those of officers who represented the second generation.

Of the 77 guests present there were many who had reached high rank or had left the Service and attained prominence elsewhere. In the "get-together" before dinner snatches of conversation revealed some indelible memories of the past. A very senior officer, for instance, was to be heard recounting with much relish the story of an elderly C.F.S. padre who found a goat in his bed.

W/C. Jenkins, of Air Service Training, who passed no fewer than 40,000 aircrew through his hands during the war, was talking with great enthusiasm, about A.S.T. ventures in the East. For India, they have started an officers' college and technical school at Bangalore, and for Pakistan a replica of Halton at Karachi.

Before dinner two of the instructors (S/L. A. Knowles, A.F. C., on a Vampire, and F/L. G. S. Hulse, D.F.C., flying a Meteor) put on a show which proved that the standard of C.F.S. flying is still as high as ever; and the guard of honour, in a programme of complicated exhibition drill before the visitors, are to be complimented for smartness of turnout.

# AIR MARSHAL SIR LESLIE GOSSAGE

IT is with regret that we have to record the death, at his Sussex home last Friday, of Air Marshal Sir Leslie Gossage, K.C.B., C.V.O., D.S.O., M.C., R.A.F. (ret.). He was 58 years of age.

Sir Leslie will be chiefly remembered for his distinguished services in the Second World War as A.O.C. of Balloon Command. His Service career began in 1912, when, on leaving Cambridge, he entered the Royal Artillery, subsequently (in 1915) being seconded to the R.F.C. He served in France throughout the 1914-18 war, and in 1919, as a Squadron Leader, was granted a permanent commission.

Between the wars his varied duties included those of Deputy Director of Staff Duties, Air Ministry; Air Attaché, Berlin; S.A.S.O., Air Defence of Great Britain; and A.O.C. British Forces in Aden. When war broke out he was A.O.C. No. 11 Group, Fighter Command, and early in 1940 he received a senior Air Ministry post as Air Member for Personnel, with the rank of Air Marshal.

In November 1940, he was appointed A.O.C. Balloon Command, and in the four following years during which he held that post his initiative and organizing ability played a great part in the success of the barrage balloon as a weapon of defence.

Early in 1944 he retired, but was immediately re-employed, and, with the rank of Air Vice-Marshal, was appointed Chief Commandant and Director-General of the Air Training Corps, being charged particularly with the duty of securing a closer link between that organization and the R.A.F. He reverted to the retired list in April, 1946.

## SOPWITH OLD-TIMERS' REUNION

ORIGINAL apprentices of the old Sopwith Aviation Company are to meet at a reunion dinner in London on July 20th, given by Mr. Fred Sigrist. They will incude Messrs. Jack Williams, Victor Derrington, C. Matthews, Duncan Davis, R. W. Sutton, Donald Healey, N. Sparkes and Frank E. Bucknell.

# DEAUVILLE 1949

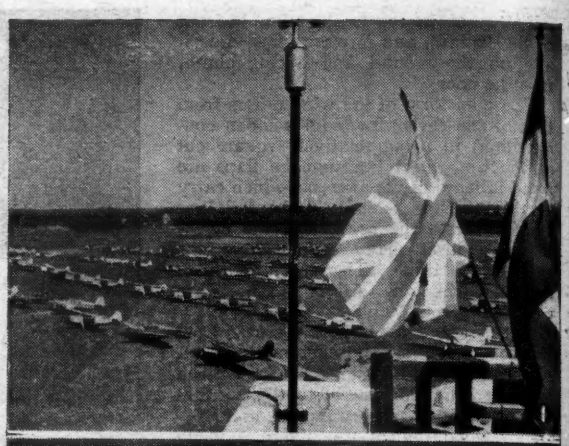
## *A Record Rally : Over 400 Air Guests from England*

NOW becoming a classic event in the social-flying calendar, M. André's annual rally for Royal Aero Club members and associates, held at Deauville on the Normandy coast, this year beat all records for attendance and brilliance. By Saturday evening, July 2nd, no fewer than 125 aircraft had arrived at the local St. Gatien airfield, and their bright colours as they stood assembled in rows would have put to shame even the dozens of gay sunshades of the dazzling Deauville *plage*.

The total number of guests was over 400, the great majority of whom arrived in British light aircraft. The arrival of a few people in larger charter machines—a mode of travel perhaps not quite in keeping with the spirit of the affair—was excusable this year, for in most cases there were literally no club aircraft left for them to fly.

The programme was as in previous years: After installing themselves at the luxurious Royal Hotel overlooking the seashore gardens, most of the guests went for a welcome swim, then looked round the enticing shops until it was time to dress for the ball at the Casino. During the evening celebrations prizes were given for the arrival competition and for the best "first impressions" recorded on landing. At midnight there was a most spectacular firework display outside the Casino; seen through the huge windows, it suggested a nocturnal snowstorm of gold and silver sparks. The R.Ae.C. were fortunate in having present Lord Brabazon to thank M. André and his associates for their magnificent hospitality. The host, said Lord Brabazon, by showing them "glorious Deauville" had shown them a world to which they were now unaccustomed. He was pleased, he added, to see present their good friend Major Jacques Allez (president of the Aero Club de France), together with M. Fossorier (Mayor of Deauville) and Commandant Hurel of the local aero club.

On Sunday, drinks at the Yacht Club—an innovation for 1949—were followed by a luncheon at the New Golf



*(1) Participants' aircraft lined-up on St. Gatien airfield. (2) An Olley Air Services Dove. In the background is the control building. (3) A change from swept-wing jets—S/L. Wade alights from a Gemini. (4) The reception committee at St. Gatien. (5) Entertainment at the Yacht Club.*

*"Flight" photographs.*

## Deauville 1949 . . . . .

Hotel, most pleasantly situated on the hill behind Deauville, some 150 of the air guests attending. The perfect weather (which had graced the rally since the start from England) continued, and it tempted most people to spend as much time as possible in the sea and on the beach. Dinner was again taken in the Casino Ballroom.

It was apparent this year that most of the rally participants "knew the form" and had come prepared with full holiday attire in spite of restricted luggage-weight. Moreover, there was undoubtedly a more friendly atmosphere than in former years, as a result of most people knowing the majority of others at least well enough to say "hello." Much as everyone would like to see more and more aircraft owners take part in the Deauville Rally each year (and it is more than probable that M. André would be pleased to welcome them) it was agreed that the limit had been reached, the Hotel and Casino Ballroom being filled to overflowing. No doubt there will be great competition next year.

*Practised Rallyists: Mr. and Mrs. Porteous at Deauville.*

*Mr. Giles Reid-Walker, winner of this year's Goodyear trophy arrives in his Piper Super Cruiser with (right) Mr. "Ben" Gunn, Boulton Paul's new test pilot.*

The affair was neatly summed up by one visitor in the remark, "Bags of Austers but no austerity."

Another innovation this year (and one which accounted for Lord Brabazon's presence) was a golf match arranged between the Royal Aero Club and the Aero Club de France. It was won by the R.Ae.C., three matches to nil. The scores were as follows:—

| | | | |
|---|---|---|---|
| Lord Brabazon .. .. | v. | G. Leglise .. .. | 3 and 2. |
| W/C. Rankin .. .. | | J. Allex .. .. | |
| Col. Craigie .. .. | v. | A. M. Vagliano .. | 2 and 1. |
| P. Q. Reiss .. .. | | Eric Taff .. .. | |
| T. F. Mitchell .. .. | v. | Dr. Hally Smith .. | 2 up. |
| G. A. Tyson .. .. | | M. Marquisan .. .. | |
| Capt. D. Saville .. .. | v. | R. Wybrant .. .. | All square. |
| Major Pinto .. .. | | A. Jappy .. .. | |

## "GIPSY MAJOR" MODS.

TO fit the engine for service with a wider range of metal airscrews and to permit the use of higher-octane fuels, the Mk 2 de Havilland Gipsy Major 10, which is specified as the power unit for the Chipmunk and the Drover, embodies a number of changes in construction. The crankshaft has been stiffened by an increase in the diameter of the five main journals, and the one-in-ten taper of the airscrew shaft has been replaced by a No. 1 S.B.A.C. parallel spline.

Incorporation of a fully floating thrust bearing, with increased oil flow, has necessitated redesign of the crankcase front cover, which, however, remains available in two forms, for fixed-pitch and for mechanically variable pitch airscrews respectively. Sodium-cooled exhaust valves, of larger stem diameter, are fitted, and permit any fuel with an octane value of greater than 80 to be used; inlet valves of improved material are also fitted.

Other changes include provision for an additional self-lubricating drive for the generator drive; a horizontally—instead of vertically—divided air-scoop, to facilitate servicing; redesigned stainless-steel induction manifold heater box, with increased operational life; and larger-diameter airscrew hub to accommodate the splined shaft.

## BIG WHEELS THEN AND NOW

AN interesting comparison between the landing gear of the Bristol Brabazon I and a very much earlier "giant" aircraft is made by the Dunlop Rubber Company. The "Brab" has four twin-tyred main landing wheels and a twin nosewheel. The main-wheel tyres, reinforced with rayon cord, are 63 inches in diameter.

The earlier aircraft was the Beardmore Inflexible (*circa* 1927), an experimental three-engined monoplane of 157ft span, and its two main wheels had a diameter (less tyre) of over 60in; by contrast, a Brabazon main wheel, less tyre, measures less than 36in. In wheel-width, however, there is a more striking difference: whereas the Inflexible wheel was only about 15in wide, the Brabazon wheel has a width of nearly 36in, to accommodate the brake units.

The brake-operating mechanism has also been developed by Dunlop and is electro-pneumatic in operation (compressed air is claimed to have the advantage of cleanliness, availability and freedom from fire risk). The air is stored in 20 solid drawn cylinders and is fed to the brakes through differential relay valves, which can be operated by either of the two pilots. This system allows either the port or starboard brakes to be operated independently for steering the aircraft on the runway or together when pulling up after landing.

Although it has been necessary to develop special components to meet the problems of controlling the aircraft, extensive use is made of standard Dunlop flexible pipes throughout the pneumatic and hydraulic systems for the operation of the brakes, undercarriage and flying controls, etc.: in addition, flexible pipes are used as fuel and oil feeds to the power plants. Altogether, over 500ft of this flexible piping are used.

### FORTHCOMING EVENTS

July 16th.—Royal Naval Air Station, Anthorn, Kirkbridge, Carlisle: Navy Day.
July 16th and 17th.—Royal Aero Club: Private Air Rally at La Baule, St. Nazaire. Guests of Mme. André.
July 17th.—Cowes Aero Club: Air Display.
July 20th—Aircraft Golfing Society: Mid-week Competition, East Brighton.
July 23rd.—"Daily Express" Air Pageant, Gatwick Airport.
July 30th to Aug. 1st.—King's Cup Race and National Air Races, Elmdon Airport, Birmingham.
Aug. 6th.—Southend Flying School: Flying Meeting and Air Display.
Aug. 19th to 26th.—British Gliding Association: National Gliding Contests, Gt. Hucklow, Derbyshire.
Aug. 21st.—Wiltshire Flying Club and Royal Artillery Flying Club: Thruxton Air Races.
Aug. 28th.—Cowes Aero Club: Air Display.
Sept. 6th to 8th.—R.A.F. Golfing Society: Autumn Meeting and Ladies' Section Championship at Walton Heath Golf Club.
Sept. 7th to 11th.—S.B.A.C. Annual Flying Display and Exhibition, Farnborough.
Sept. 7th.—R.Ae.S. (Luton): "Air Liner Operation."
Sept. 12th to 18th.—Battle of Britain Week. R.A.F. "At Home" day Sept. 17th.
Sept. 14th.—Inter-Services Swimming Championships, Seymour Hall, Marylebone, London.
Oct. 5th—R.Ae.S. (Luton): Film Show.
Nov. 2nd.—R.Ae.S. (Luton): "Gas Turbine Development."
Nov. 23rd.—R.Ae.S. (Luton): "Brains Trust."
Dec. 7th.—R.Ae.S. (Luton): "Role of Aircraft in Future Warfare." Air Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C.

# WHEEL BRAKES

## Their Development, Design and Use

### *Part II : Disc Brakes : Lining Materials : The Future—Advance of Reversible-airscrew and Other Systems*

By MAURICE F. ALLWARD

IN the previous article the various designs of expanding or drum brakes were considered, and we now turn to a contrasting type, namely, the disc brake. Generally speaking, the brakes of this kind may be said to have three main advantages over the drum brake, as follows:—

(1) A drum, when hot, may lose its cylindrical shape and expand considerably, thus adversely affecting braking performance; this expansion does not affect disc brakes to the same extent.

(2) The drum dissipates heat from the wall opposite to that in which it is generated, but the disc, heated on both sides, has more even heating and cooling, thereby lessening chances of distortion. Also, the larger exposed area for cooling is in the correct attitude to the airflow for efficient cooling.

(3) It is easier to isolate thermally the mass of the wheel. Heat transfer from the disc into the wheel can be kept down to a remarkably low level, as the only full metallic contact between the two is between the edges of the keys and keyways. The disc thus floats, and the expansion due to heat is allowed for in the design of the keyways. This, perhaps, is the most important feature of the disc brake and allows the admittance of the much-increased operating requirements of to-day, whilst even reducing the likelihood of tyre and tube failure from excessive brake-heat.

Comparative weights depend essentially on the temperature to which the braking surface can be taken, and the amount of cooling that can be achieved by direct dissipation to the atmosphere. There is a tendency to believe that discs can more reliably be taken to higher temperatures than drums, and should, therefore, ultimately prove to be the lighter, but this is not entirely borne out in practice at the present time.

As in most things aeronautical, a series of compromises is necessary between various contradictory factors; for example: (1) The disc will obviously cool more effectively when exposed to the slipstream and circulating air, but a disc which is not protected in some manner will be subjected to damage by dust, sand, or other foreign bodies, possibly resulting in rapid lining wear. An exposed disc also has the disadvantage of having projecting bulky components, sometimes necessitating longer and stiffer—and consequently heavier—axles.

(2) Use of very small specific lining area under high pressure gives the maximum exposure to the disc and therefore good cooling. On the other hand, an appreciable increase in lining contact pressure may tend to make the lining performance variable, and this, in turn, may give rise to an undesirable increase in the rate of wear of the brake.

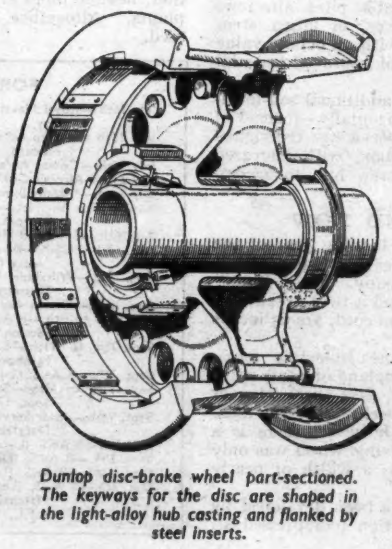
(3) The greater the mass of the disc—that is, the thicker the disc—the greater is the heat it can absorb. But the thicker the disc the greater the temperature gradient, and an allowable final mean temperature of, say, 500 deg C could correspond, during braking, to an incredibly high surface-temperature. Most discs are plated with hard chrome to increase resistance to abrasion and oxidization and such a temperature could cause the formation of chrome oxide which, having no mechanical strength, would be torn off instantly in service.

The trend of present developments is to put the accent on better cooling at the risk of some damage to the disc; the use of greater lining areas, with a consequent reduction in area exposed for cooling; and thicker discs at the risk of very high surface-temperatures. The continually increasing kinetic-energy absorption requirements are likely to promote multiple discs, in order to keep the individual disc mass down to reasonable proportions. It will thus be seen that, as in the case of many other aircraft components, successful design is largely a question of well-judged compromise.

**IN Part I of this article, published last week, the author reviewed early developments and present types of expanding-diameter brakes. Here he goes on to deal with disc brakes and to discuss various general problems of brake installation and use, concluding with a consideration of other systems—e.g., reversible-pitch airscrews—designed to supplement the effect of wheel braking.**

Basically, disc brakes consist of an operating unit which is mounted astride a disc rotating with the wheel. The operating unit is fixed to the axle or torque plate, while the disc is mounted on keys located round the rim of the wheel. Thus the disc normally runs through the operating unit, and is clamped between the linings when the brake is applied.

The housing of the operating unit contains pistons, usually hydraulically operated (although some small brakes are mechanically operated), which exert pressure on the linings on one face of the rotating disc that moves axially along the keys in the wheel to contact the opposing fixed lining member on the other side. As the brake pressure is increased the rotating disc is clamped more tightly between the linings, and its rotation is arrested by such clamping action in proportion to the pressure applied.



*Dunlop disc-brake wheel part-sectioned. The keyways for the disc are shaped in the light-alloy hub casting and flanked by steel inserts.*

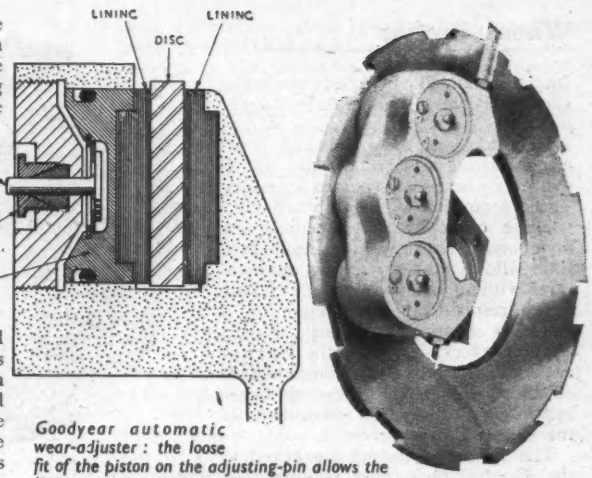
Small disc-brakes have only one lining pad, but the larger and more powerful types have three or more, arranged either closely together or spaced around the edge of the disc. The lining pads are usually circular in section, as these are cheapest to make, but sometimes they are of kidney section which, with a special form of hydraulic-motor unit, gives an increased load with the greatest economy of weight. This shape is adopted on several Palmer brakes, which use a sealed hydraulic capsule instead of a normal piston unit.

On the Goodyear brakes, three pads are bunched close together;

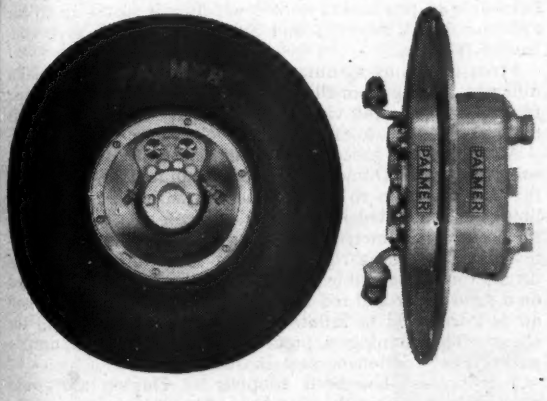
the disc is mounted almost flush with the edge of the wheel, so that one side is fully exposed to the airstream to ensure a rapid dissipation of heat. By positioning the operating unit behind the undercarriage leg, its blanking effect is kept to a minimum and the maximum effective cooling area exposed.

An interesting feature on these brakes is that no lining clearance adjustments are required, since these are effected automatically by one of two schemes. On the larger brakes the adjustment device is incorporated in the operating unit. The piston carrying the lining pad is mounted on the head of an adjusting-pin, the stem of which passes through a packing nut. The attachment allows a predetermined axial movement of the piston equal to the desired clearance. When the brake is operated the piston is pushed against the underside of the head of the pin, which is then pulled through the packing nut by an amount equal to the wear on the lining. Upon release of the brake the piston slackens off by an amount equal to the slope of the attachment. As the lining wears, so the adjusting pin is pulled farther through the packing towards the disc. It is this operation which automatically takes up the wear on the linings and is progressive right through their life. On release, when an adjustment has automatically taken place, the piston will again return only to the designed clearance.

Testing for operating clearance with the aircraft on jacks is misleading, because the roll of the wheels over the ground immediately after releasing the brakes assists in the recovery of clearance. The best test procedure is applied after the aircraft has rolled a few yards and before the brakes have again been used. No more than a brushing of the linings on the discs should then be felt.




*Goodyear automatic wear-adjuster: the loose fit of the piston on the adjusting-pin allows the linings to return to a predetermined clearance when the brake is released. On the right is the Goodyear single-disc brake.*




*The small Palmer brake assembled in a wheel: it is mounted on the outside to obtain maximum cooling effect from the slipstream. On the right it is shown unmounted.*

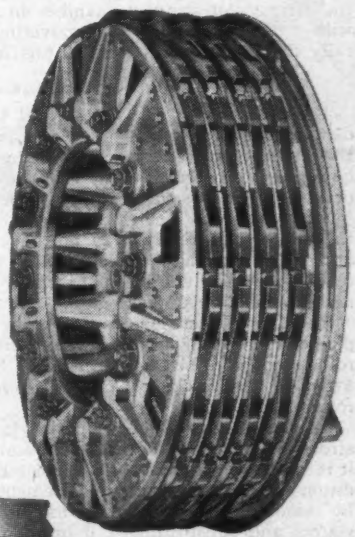
On the smaller brakes, the self-adjusting mechanism is incorporated in the master cylinder. On this, as the linings wear, the operating piston merely follows further through the cylinder, and the extra volume of hydraulic fluid to compensate for this extra travel of the piston is taken from a header tank by the master cylinder at the commencement of each working stroke. The reservoir pressure-head holds the linings in contact with the disc and this allows the omission of return springs. The pedal or lever travel thus remains constant throughout the life of the linings, the only effect of wear being that more oil is brought into the brake cylinder.

This scheme does not give an initial clearance, but if the reservoir pressure is controlled no undue idling friction results.

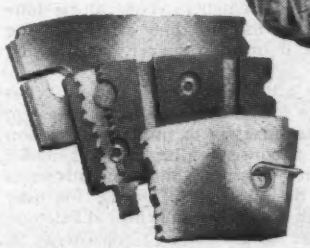
Two disc brakes which differ from those already reviewed are the Messier "Multi-spot" and the Bendix "Segmented Rotor" brakes.

Embodying several unusual features is the Messier "Multi-spot," which is claimed to combine the advantages of early types of multi-disc brakes with the cooling of the exposed disc type. The linings are equally spaced around the disc in a metal carrier pierced with holes; circular lining pads are used for ease of manufacture. Multiple discs are fitted, each of relatively narrow section so that the temperature gradient across each is reasonably flat, thus improving the instantaneous storage-capacity of the brake. The complete unit is housed inside the wheel and cooling of the discs is assisted by the forced circulation of air through the brake, due to the rotation of the spaced elements, which throws air radially outwards under centrifugal action. This cooling is not so effective as for exposed discs, but the multi-discs provide an ample storage capacity, so cooling is prolonged.

The Bendix brake is sufficiently different from previous "multi-disc" types, both in design and function of parts, to warrant a separate classification, and the term "segmented-rotor" type is used. The rotating members or rotors are not thin plates, but are substantial discs of sizeable thickness. In this way a sufficient mass of metal is provided to function as an effective heat-reservoir. This capacity for heat absorption increases the possible rate of energy absorption of the



*Bendix segmented-rotor brake as fitted to the Lockheed Constellation.*

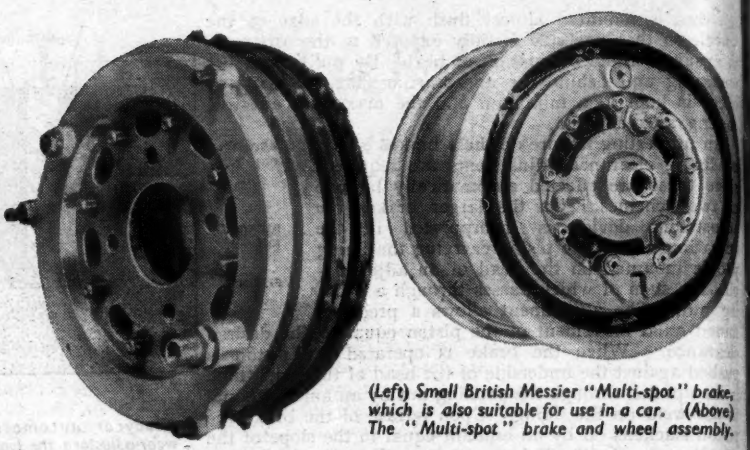


*Bendix brake: detail of friction-lined stator between two segmented rotors.*

## Wheel Brakes . . . . .

friction members without producing excessively high temperatures in the rotors.

Each rotor, on the other hand, is not a continuous ring of metal, but is made as a series of separate segments. These segments are flexibly attached to each other by special connecting members. The resulting segmented rotor allows higher working temperatures without the warping or cracking which result from heat expansion if one-piece construction is used. A self-aligning effect, in which the segment surfaces tend to lie flat against the face of the lined member during brake application, is another advantage of the segmented rotor.



*(Left) Small British Messier "Multi-spot" brake, which is also suitable for use in a car. (Above) The "Multi-spot" brake and wheel assembly.*

The segmented rotors are keyed to the wheel at their outer periphery, so that they turn with the wheel but have the normal limited free axial movement to permit application and release. The rotors are pressed between thinner discs called stators, which are faced with friction material. The stators do not turn with the wheel, but are keyed to the brake carrier; similarly to the rotors, they have limited free axial travel for application and release.

The friction lining of the stators consists of a number of separate segments instead of a continuous ring, thus providing a ventilation channel between each segment which allows air to circulate and cool the rotor. An important result of this internal ventilation is the elimination of "fading," or decreased brake effectiveness, toward the end of periods of severe application. In addition, lining dust resulting from lining wear is scavenged into the ventilating channels, promoting better friction contact between the stator and rotor surfaces and reducing the required pressure for a given friction effect.

The third main structural element of the brake is the carrier, which is rigidly mounted to the support member of the strut. An annular chamber in the carrier is fitted with a piston ring and seal, providing means of hydraulically forcing the rotors and stators into contact.

### Variable Dimensions

The basic design can be adapted to wide variations in diameter and thickness to suit the available space within the wheel. For a given total braking area the brake may be a large-diameter assembly using possibly only one rotor, or it may be a small-diameter, thicker assembly, using several rotors. A result of the design is that water within the brake apparently has no adverse effect upon its operation; tests have indicated that even the pressure of oil or hydraulic fluid does not seriously impair its effectiveness or smoothness of operation.

Sizes have been developed ranging from five inches in diameter to 31 inches, using in some designs only one rotor and in others—such as the high-capacity brakes fitted to the Lockheed Constellation—as many as four rotors.

As an illustration of adaptability, the braking of an aircraft can be reduced in capacity and weight even after it is in service, should (for example) altered operating conditions reduce the braking requirements. This can be done by removing one or more rotors and their accompanying stators and substituting a light-alloy spacer, so effecting a useful saving in weight.

The high efficiency now attained by brakes of all types is due in no small measure to the linings fitted. The aim of the brake-lining manufacturers is to produce a friction material which will give a consistent brake effort under all conditions required of it. Owing to the rapid advances and changes in aircraft design to-day, calling for ever higher landing speeds with reduction in wheel diameters, the temperature range over which braking consistency is required is an ever-widening one. A further continual aim is to avoid high-temperature fade and wear, and good progress has been made in this direction. The stability and wear rate of a lining is, generally, more important than the actual coefficient of friction obtainable.

Well-known names amongst those manufacturing high-duty materials for aircraft are British Belting and Asbestos, Ferodo, George Angus, Richard Klinger, Duron and Raybestos and it is a remarkable achievement that they have been able to produce materials which will stand up to the arduous duties required and at the same time give controlled friction.

From the lining-manufacturer's point of view the major difficulty arising from the trend towards the ventilated-disc type of brake is the varying rubbing speed from one side of the brake pad to the other, which causes uneven wear.

An interesting process in the manufacture of expanding-tube brakes by Dunlop is that of "running in," which is the last operation to be done before delivery. The brake linings are mounted in specially adapted disc grinders and their outside diameters trued up. The unit is then transferred to a running rig comprising a dummy brake drum driven through suitable gearing. The backplate is mounted on a rigid arbor and fed inside the drum, while compressed air is introduced to inflate the bag, and thus expand the shoes. The running-in process is then continued until a well-bedded friction surface is obtained.

This process has been adopted by Dunlop and some other firms to avoid the user having to wait until excessive taxying has been done before optimum results are obtained. It particularly applies to some of the very latest extreme-duty materials, which do not give their best until they are run-in against a red-hot surface.

The distance which an aircraft runs after landing depends not only on the efficiency of the brakes, but also on the skill of the pilot, who has to try to maintain the braking at close-to-maximum throughout the stopping period—a time when his attention is probably concentrated in other directions. This being so, considerable thought has been given to the possibility of using the potential energy of an aircraft to effect its braking. The amount of kinetic energy available in an aircraft landing at high speed is phenomenal—in a machine of 20,000 lb weight, landing at 100 m.p.h., it is approximately 6½ million ft/lb. In 1934 an experimental Messier aircraft was fitted with brakes controlled by the pressure in the undercarriage shock absorbers. Later that year tests were carried out with the tailwheel shock absorber acting hydraulically to apply the brakes. The results were excellent and enabled the aircraft to land in a distance 25 per cent less than normal, and this without any risk of skidding.

Such a scheme, however, has the disadvantage of complicating the duty of the shock absorber, and normally there will already be ample power sources available on board. In addition, as the brakes must be able to operate at take-off conditions, it would be necessary to store energy

## Wheel Brakes . . . .

for this particular purpose, which would tend to introduce further complications.

Modern brakes are barely keeping abreast of requirements. The prospect of ever-higher landing speeds and all-up weights indicate that some drastic changes or some form of retarding force additional to that obtained from wheel brakes will become most desirable, if not essential, on some future aircraft. Already considerable thought has been given to the problem, though some of the suggestions considered have bordered on the fantastic.

Intensively developed over the past few years, for both piston- and turboprop-engined aircraft, is the reversible-pitch airscrew, which is proving remarkably efficient. For reducing the landing run, and for ground manœuvring such as turning or backing, such an airscrew is extremely valuable on large civil airliners and military aircraft. It is particularly useful on ice-covered runways, where wheel braking might be treacherous.

The introduction of tricycle undercarriages has enabled higher wheel-braking forces to be used without fear of the aircraft nosing over, but it has aggravated the energy-absorption problem, since the aerodynamic drag is considerably less than for the earlier type in the tail-down attitude. An idea of the loss is given by an approximate calculation which showed that, to provide a tricycle-undercarriage fighter with a drag equal to that for a tailwheel layout just after touchdown, required an addition of about 20 sq ft of air-brake area, which was not a practicable proposition. When calculating the size of brake required it is usual to assume that all the kinetic energy must be consumed by the brakes on a nosewheel type, but only 0.7 for the tailwheel types.

Aircraft fitted with double flaps could be given an increase in drag by swivelling the subsidiary flap round, this movement simultaneously closing the slots and obstructing the flow over the top surface of the wing. This would however, further complicate the flap-operating gear.

Of the more unconventional efforts, an emergency braking method tested in the United States on light aircraft consisted of a type of gun fitted vertically in the fuselage which, at the moment of landing, shot into the ground a "harpoon" attached to a cable made from a material similar to nylon which, when stretched, absorbed an appreciable amount of energy. Such a scheme obviously could not be used on concrete runways. An idea (put to the test by the Germans during the last war) which appears to have interesting possibilities, particularly on snow-covered runways, is the tail parachute. One, of ribbon pattern to permit the maximum passage of air, is fitted to the Boeing XB-47 jet bomber, and has proved quite satisfactory in operation.

### Wires and Rockets

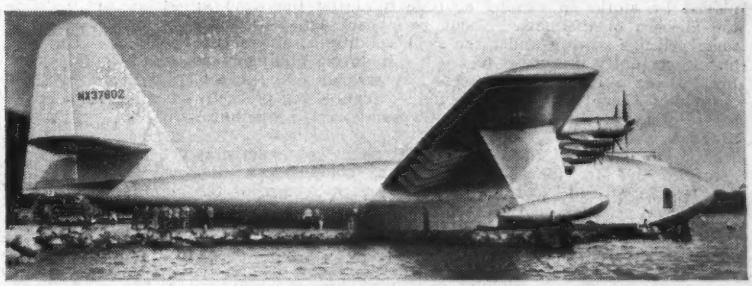
Two schemes which would have the advantage of being able to utilize experience already gained are, first, the use of arresting wires across runways and, secondly, forward-firing rockets. The first would require wires and retarding gear similar to that developed for aircraft carriers, but would be considerably less fierce in operation, and the aircraft would probably only pick up the wire after touchdown in order to avoid the possibility of bouncing passengers through the cabin-roof. Such a scheme would be quite cheap to adopt.

The forward-firing rockets suggestion would utilize a form of modified JATO rockets. They would have to be permanently housed within the structure, probably inside the fuselage, and would be faired in during normal flight. Such a scheme would appear to be eminently suitable for the supersonic aircraft of to-morrow which will probably touchdown at speeds that, even to-day, would seem quite impracticable.

None of these ideas by itself is likely to make the wheel-brake redundant. It would be supplementary to them and, on first introduction at any rate, would probably be used only in an emergency when it was desired to shorten the normal landing run for a particular reason.

# NEWS OF THE HUGHES

HOWARD HUGHES recently announced improved launching and hangarage facilties for the vast Hughes flying boat—sometimes known as the Hercules—at present docked at Terminal Island, Los Angeles Harbour. A new metal hangar and a novel dry-dock cradle will be constructed simultaneously while delivery of suitable airscrews is awaited.




*The eight-engined Hughes flying boat will carry up to 700 troops.*

The eight-engined Hughes is the world's largest aircraft; so far it has cost £7,000,000, of which Hughes has voluntarily contributed £2,500,000 in addition to the United States Government's £4,500,000. The boat was built at a lower cost per pound weight than any other large prototype. Removal and replacement of the skin from elevators, ailerons and rudder has been undertaken as a precautionary measure because of discovery of broken ribs and structure inside the tail assembly. The removal of the skin and the complete inspection of all the internal structure of these surfaces required detachment of both elevators and ailerons in their entirety. These structures are enormous, each elevator being larger than the wing of a Boeing Fortress. The interior damage could have resulted in a serious accident had it not been discovered before flight. Damage did not exist when the aircraft was returned to dock after its initial water-taxying tests in the spring of 1948.

Although the aircraft has made fast taxi runs in the hands of Howard Hughes himself and has even flown for about a mile at a height of 100ft over Los Angeles Harbour, flight trials are still held up through lack of suitable airscrews. Hughes has been negotiating for the supply of a set of Hamilton Standard "high-activity" blades but is being forced to await delivery owing to other priority orders.

It was originally planned to moor the flying boat in the harbour for the 21 days during the construction of the hangar and cradle, and it would have been necessary to re-dock it for installation of the new airscrews. However, Hughes was concerned over the danger of high winds and ramming.

The installation of the new cradle, while supporting the tremendous weight of the boat, presented a complex problem; it will be solved by carrying out the work section by section. The cradle will make use of the pivot principle, and will be easily adjustable to any angle determined by the flying boat's centre of gravity during a particular launching or docking; the placing of tremendous pressures on the hull is eliminated and safer and faster launching and docking are permitted.

The Hercules is at present sheltered by a tubular steel canvas-covered frame. Metal sheets will be laid on top of this structure to serve as "armour plate" protection from any falling tools or beams while the new hangar of steel and corrugated aluminium is being constructed.

In order to obtain full performance data for the boat, testing will be spread over a long period. The purpose of the entire test programme will be to provide information on the design, construction, and flight of very large aircraft.

After the boat has launched for the second time in its long but inactive career, it will be tested on the water, probably for many months.

# CORRESPONDENCE

*The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.*

## DECK LANDING

### *Interpretation of a Photograph*

I WOULD like to point out that your correspondent "Ex-832 Type" (*Flight*, June 30th) errs when he says that your caption above the McDonnell Phantom picture (June 16th) is not quite correct. If the aircraft was about to land, the batsman's hand would be at a much higher level, as the U.S. Navy "cut" signal is across the throat. The aircraft in the photograph obviously is "going round again"; the batsman, having seen that the pilot has obeyed the wave-off signal is disinterestedly watching it fly past.

G. P. WATSON.

Middleton, Manchester.

## CHILDHOOD MEMORY

### *A Pioneer Aircraft—Information Still Wanted*

IN your issue of June 9th, you published a letter in which a reader recalled having seen in his childhood a pioneer aircraft being flown from a wooden runway in a field somewhere in the neighbourhood of Hanger Hill, Ealing. As I, too, have dim memories of this early effort (about 1908-9, I think), I was interestedly awaiting any replies that might have been forthcoming in answer to your reader's request that some old-timer might be able to refresh his memory as to the identity of this machine. Since the letter was published, however, I have seen no further reference to the matter, and perhaps you would be kind enough to publish this in order that it may catch the eye of someone who is in a position to satisfy the curiosity of—now—at least two curious readers.

London, S.W.1. W. J. SMITH.

## CLIMB OF STORKS

### *—imitated by a Glider Pilot*

I WAS very interested to read a paragraph in the Correspondence Column of your issue dated March 17th, written by Mr. C. H. A. Johnson and describing the technique employed by storks in gaining altitude by using the wind in the absence of thermals. About two years ago I watched some pelicans soaring under the same conditions, and at the first opportunity proceeded to try it out during gliding practice. Using a Pruffling-type secondary sailplane, and selecting a day when thermals were not in evidence, but a steady breeze of 15 m.p.h. was blowing at ground level, I was auto-towed to 750ft.

From the point of release the flight path was exactly as described by Mr. Johnson. After four complete circuits, 100 feet in altitude had been gained and a return to the airstrip was necessary as the machine had drifted too far downwind for comfort. I got a real thrill out of that episode, but have not had the opportunity to try it since.

GIL MILES

Croydon, N.S.W. (Member of Hinkler Soaring Group).

## THE "BEAU"

### *—was also a Flying Test-bed*

A CORRESPONDENT'S tribute to the Beaufighter (*Flight*, June 30th) prompts us to say that one of the last, but by no means least, of the rôles filled by it was that of flying test-bed. Aircraft JL 871 and LZ 184 were used extensively for low-drag cowling and oil-cooler development respectively, while RD 810 was the first aircraft to be powered by the "copper-head" Hercules, the forerunner of the now-renowned Hercules 230 and 730 series. These three aircraft were operated from Filton by the Bristol Aeroplane Company.

It is over a year since the services of these versatile aircraft were dispensed with, and although their successors are perhaps more ideally suited to the present types of engines undergoing development, we, as flight-test observers, were nevertheless sorry to lose an old friend. At all times thoroughly airworthy, with a high standard of serviceability (major considerations for test aircraft), the old "Beau" in no small way contributed to the technical knowledge from which has emerged the present-day Hercules.

We came to consider ourselves not merely the crew, but a part of this very "personal" aircraft. We thoroughly enjoyed flying in these machines, but there were times (at 25,000ft or thereabouts in mid-winter) when the cabin heating system wasn't quite up to these unexpected surroundings.

Admittedly, the handling and perhaps performance of the "Beau" in its very early days were not quite all they might have been, but how many aircraft in recent years have been just right from the word go?

We say good-bye to an aircraft whose deeds in the fields of battle are common knowledge, but we do not forget its useful contribution to technical development.

Filton, Bristol. GARETH L. JONES,
(for Staff of Engine Development Test Flying Department, Bristol Aeroplane Company, Ltd.)

## DOUBLE-DECKERS

### *A Recollection from Germany*

IN your issue of May 5th Mr. Christopher Blackburn wrote, in his letter about "Double-deckers," that the Sandringham I flying boats were the first airliners with two decks. With reference to this fact I have to remark that double-deck flying boats were ordered ten years ago by the Deutsche Lufthansa and built by the Blohm and Voss works at Hamburg. These six-engined BV 222 Wiking flying boats were used during the war by the Transport Command of the German Air Force and flown by pilots of the Lufthansa in more or less regular service between Germany and various places in the Northern and Mediterranean Area some years before the Sandringham boats entered regular service.

Mr. John O. Isaacs, in the same issue, suggested a consolidated work of reference of Britain's aeronautical history and I support his idea, because I had the same intention, not only for British or German aircraft but for all aircraft built since World War I. I have compiled a list of more than 1,000 different types of aircraft, with dates and partly with photographs. If Mr. Isaacs would be interested in an exchange of data to complete his list I shall be glad to receive a letter from him (my full address is 14b, Friedrichshafen a.B., Charlottenstrasse 61, French Zone, Germany). I am sure that national resentments should not prevent such an exchange.

Friedrichshafen, Germany. FRANZ SELINGER.

## AUSTRALIA'S CITIZEN AIR FORCE

### *Not Formed, but Re-formed*

AS the first, and, for six months in 1931-32, the only Citizen Air Force Flight Sergeant in the R.A.A.F., I was surprised to see in your issue of June 16th a reference to the "inauguration of Australia's Citizen Air Force" as if this had only recently taken place. I joined the Citizen Air Force as a member of No. 1 Squadron (then stationed at Point Cook) in 1926 as part of the second batch of trainees, my number being 5,200, i.e., the 200th entrant. At the same time there existed another squadron, No. 3, at Sydney. No. 1 was later moved to Laverton.

Both squadrons had a cadre of permanent officers, N.C.Os and men, to the total of about 30, and were made up to full strength with "Saturday afternoon airmen"—about twelve officers as pilots, and N.C.Os and men.

In 1926, under the command of S/L. R. J. Brownell, No. 1 Squadron comprised one army co-op. flight (D.H.9's and Avro 504K), one fighter flight (S.E.5a) and one day bomber flight (D.H.9a), but later, at Loverton, under S/L. A. Hepburn, the unit was turned into a bomber squadron, equipped first with 9a's, which were gradually replaced by Wapitis.

After I returned to England in 1932, I used to still hear news of No. 1 Squadron, and several of my former comrades came over here with the R.A.A.F. during the second world war. From them I gathered that the C.A.F. personnel of No. 1 Squadron were "budded out" to form a completely C.A.F. unit as No. 21 Squadron (with Blenheims or Beauforts).

Possibly during the war the C.A.F. became completely submerged in the wartime R.A.A.F.—unlike the R.A.F.V.R., they had no Brasso-smudge and badge holes on their lapels to be jealously guarded and kept up to a reasonable degree of prominence; and presumably now, like the V.R., they are blossoming out again as a distinct entity. But it is "again" and not "for the first time."

JOHN V. ROBERTS.

Knock, Belfast.

[Yes—"inauguration" should have read "re-inauguration"—ED.]

# SERVICE AVIATION

## *Royal Air Force and Naval Aviation News and Announcements*

*BALLIOL ASCENT: Mr. A. E. ("Ben") Gunn, a former Boscombe Down pilot, and recently appointed chief test pilot to Boulton Paul Aircraft, Ltd., demonstrates the climbing capabilities of the Merlin-engined Balliol I trainer, now in limited production for the R.A.F.*

### *Award for "Yangtse" Pilot*

AN account of the operations of an R.A.F. Sunderland which repeatedly attempted to assist H.M.S. *Amethyst*, then marooned in the Yangtse river and under fire from Chinese Communist guns, appeared in *Flight* of May 12th. For gallantry during those operations, the Air Ministry announces, F/L. K. Letford, D.S.O., D.F.C., the Sunderland pilot, has been awarded a bar to his Distinguished Flying Cross.

### *"Coastal" Squadrons to be Linked*

AT ceremonies in England, Scotland, Wales and at Gibraltar this month, badges of five inactive squadrons are being linked with those of five active squadrons of R.A.F. Coastal Command. Air Marshal Sir John W. Baker, K.C.B., M.C., D.F.C., A.O.C.-in-C. Coastal Command, is attending each ceremony, and will entrust the crest of the inactive squadron to the commanding officer of the active squadron.

The first ceremony was at Gibraltar on July 4th when the Commander-in-Chief linked the badge of inactive No. 269 Squadron with that of No. 224 Squadron, based at "Gib." On July 7th, the A.O.C.-in-C. visited R.A.F. Station St. Eval, Cornwall, where he linked the badges of the inactive Numbers 36 and 217 Squadrons with those of the active numbers 203 and 210 Squadrons respectively. On July 12th, just before it left on a month's good will and training flight to Canada (the first of its kind ever made by a Coastal Command squadron) Air Marshal Baker was to hand to No. 120 Squadron, at R.A.F. Leuchars, Fife, the badge of No. 220 Squadron. The last of the ceremonies will be held at R.A.F. Station Pembroke Dock, Wales, on July 21st, when the badge of No. 240 Squadron will be entrusted to No. 230 Squadron.

### *Air Force Athletics*

JUDGING by the standard shown last Saturday at the R.A.F. Stadium, Uxbridge, when the finals of the R.A.F. and W.R.A.F. Athletic Championships took place, the R.A.F. stands a very fair chance in the Inter-Services Championships, which will be held at Aldershot on July 27th. In a brief speech just before Lady Pirie distributed the prizes, the Chief of Air Staff, Lord Tedder, refuted Air Marshal Sir Hugh Walmsley's suggestion that he had last year "inspired" the R.A.F. team to win. On the contrary, he had "instructed" them to win and, being so well disciplined, they had carried out their orders. They were to win again this year, he said, but he warned the competitors against overconfidence, and stressed the need for thorough training.

Several new records were set up during the afternoon, L.A/C.W. Wilkinson being responsible for two of them. In the W.R.A.F. 100 yards and 220 yards her times were 11.9 and 27.6 sec respectively. W/C. D. O. Finlay, the Olympic hurdler, returned the best time by an Englishman this year when he won the 120 yards hurdles in 14.9 sec. S/L. L. Reavell-Carter broke his own discus record with a throw of 137ft 9in, and another field event record was A/C J. Swaisland's javelin throw of 192ft 11in, which broke his previous record by over 16ft. The arduous two-mile steeplechase was won by Sgt. Cobley, who set up a record of 11 min 1.6 sec. Technical Training Command won both the R.A.F. and W.R.A.F. team championships, scoring 78 and 61 points respectively.

Winners of the other events were:—

100 yards (R.A.F.), A/C. Morgan (10.1 sec); Pole Vault, F/O. Redpath 11ft 3in); Long Jump (W.R.A.F.), Flt/O. Paddock (15ft 3¼in); One Mile, A/C. Browning (4 min 27.6 sec); 440 yards, L.A/C. Westwood (50.9 sec); High Jump, F/L. Brown (5ft 9in); 220 yards, F/L. Roach (22.5 sec); Three Miles, Cpl. Pirie (14 min 48.4 sec); 880 yards, F/L. Guest (1 min 57.9 sec); Inter-Command Medley Relay (W.R.A.F.), 90 Group (2 min 5.7 sec); Inter-Station Relay (W.R.A.F.), Cosford (54.6 sec); Inter-Station Relay, White Waltham (44.5 sec).

### *Promotions*

REFERENCE was made in the preceding issue to the promotion of five Air Commodores—Sir Harry Broadhurst, C. B. R. Pelly, D. A. Boyle D. Macfadyen and H. G. White—to the rank of Air Vice-Marshal. The following promotions, from Group Captain to Air Commodore, are also announced:

A. D. Davies, C.B.E. (Acting Air Commodore) Air Officer Commanding, Air H.Q., Hong Kong; H. H. Brookes, D.F.C. (Acting Air Commodore) Director of Flying Training; L. W. Cannon, C.B.E. (Acting Air Commodore) Commandant, R.A.F. Staff College, Andover; W. H. Merton, O.B.E. (Acting Air Commodore) Head of R.A.F. Delegation to Greece and Air Officer Commanding R.A.F. in Greece; H. P. Fraser, C.B.E., A.F.C. (Acting Air Commodore) now serving with Assistant Chief of Air Staff, Technical Requirements, on Defence Research Policy Committee; P. Jones, M.I.E.E., Chief Signals Officer, Transport Command; D. W. R. Ryley, C.B.E., Senior Technical Staff Officer, No. 3 Group; G. B. M. Rhind, B.A., Senior Technical Staff Officer, No. 12 Group; B. D. Nicholas (Acting Air Commodore) Director of Signals; J. D. Baker-Carr, A.F.C. (Acting Air Commodore) Director of Air Armament Research Development, Ministry of Supply; W. L. Freebody, C.B.E., A.F.C. (Acting Air Commodore) Director of Technical Policy; L. Taylor (Acting Air Commodore) Director of Movements; F. W. Felgate, C.B.E. (Acting Air Commodore) Senior Equipment Staff Officer, M.E.A.F.; O. K. Griffin, C.B.E., Officer Commanding, R.A.F. Station, Uxbridge.

Wing Commanders now promoted to Group Captain are:

J. N. Baxter; J. A. Tester, O.B.E.; G. F. W. Heycock, D.F.C.; E. M. Donaldson, D.S.O., A.F.C.; D. M Somerville, O.B.E.; M. H. Dwyer; R. Sorel-Cameron, C.B.E., A.F.C.; T. A. B. Parselle; S. C. Elworthy, C.B.E., D.S.O., D.F.C., A.F.C.; D. R. Evans, C.B.E., D.F.C.; W. W. Husbands, O.B.E.; N. C. Walker; W. S. Reed; W. L. Houlbrook, O.B.E., A.M.I.E.E., A.F.R.Ae.S.; A. A. Saw; D. A. Gibson; G. E. Watt, C.B.E., A.F.C.B. of Eng., M.I.Mech.E., A.F.R.Ae.S.; G. P. Woodhouse; A. G. Powell; W. D. Disbrey, C.B.E., A.F.C.; K. J. McKay; G. C. Eveleigh, O.B.E.; D. S. Kite; J. A. Robinson, O.B.E., B.A.; S. Lugg, C.B.E.; C. F. G. Rogers, O.B.E.; D. Lumgair; V. G. A. Bennett; H. H. Hilliar, C.B.E.; P. J. McNally, M.B.,

## Service Aviation . . . . .

B.Ch., D.P.H.; J. A. C. Critchley, B. of Eng., A.M.I.Mech.E.; W. T. Matthews, B.Sc., A.M.I.E.E.

### R.N. Flying Club

THE Royal Naval Flying Club, which was formed in 1931 and operated before the war in affiliation with other clubs, was re-opened—now with its own premises—on July 1st at R.N. Air Station Gosport. The ceremony was performed by Vice-Admiral Sir George Creasy, Fifth Sea Lord, who is president of the Club. The C.-in-C. Portsmouth, Admiral of the Fleet Sir Algernon Willis, accompanied by senior officers, attended the inauguration and heard Admiral Creasy thank Sir Richard Fairey for the gift of two Tipsy aircraft. Admiral Creasy also expressed gratitude to Captain H. H. MacWilliam, R.N., who had overcome legal and financial difficulties in the establishment of the new organization, and he mentioned also the name of Lt. Cdr. G. R. Callingham, who had done much of the spadework.

Sir Richard Fairey, in reply, praised the foresight of the British Navy in the early days of flying when, he said, they had helped to foster the aviation industry. The C.F.I., F/L. K. W. Birt, then demonstrated one of the aircraft.

It is the intention ultimately to open centres of the Club at airfields adjacent to principal Naval ports. Flying charges have been reduced to £2 5s per hour, dual or solo, and a non-flying membership of 10s 6d per annum has been introduced.

### Honorary Chaplain to the King

THE Air Ministry announces the appointment of the Rev. Noel Francis Porter, L.Th., B.A., R.A.F., to be an Honorary Chaplain to the King, with effect from June 26th, 1949, in succession to the Rev. John Francis Cox., M.C., M.A., who has vacated the appointment on retirement from the Service.

The Rev. N. F. Porter has been Assistant Chaplain-in-Chief, Middle East Air Force, since April, 1948. He was commissioned in the Chaplains Branch of the Royal Air Force in 1931 and after being chaplain for 18 months at No. 1 School of Technical Training (the R.A.F. Apprentices' School) at Halton, Bucks, served four years in the Middle East.

For some years during the war he served with the North-West African Air Forces, returning to England towards the end of 1945 to be chaplain at R.A.F. Station Mildenhall, Suffolk. He was afterwards chaplain at Headquarters, British Air Forces of Occupation, Germany, for a year before taking up his present appointment in the Middle East.

### Air Lift Crews to Demonstrate

CREWS and aircraft recently engaged in the R.A.F. Air Lift to Berlin are to present a series of demonstrations under No. 38 Group, R.A.F. Transport Command, for the Territorial Army and the Army Cadet Force, in England and Wales. They will drop either paratroops or supplies over R.A.F. airfields or Army areas in Essex, Suffolk, Kent, Devon, Cornwall and Wales during July and August. The aircrews will be men now back from Air Lift duties in Germany, for refresher training or rest periods under the rotation scheme which brings them and their aircraft back to Britain for two-month periods.

The demonstrations will be similar to those which No. 38 Group has given for the Army, or in connection with R.A.F. Recruiting Weeks in the United Kingdom. Recently, the Group gave a demonstration for Army Airborne Forces at Aldershot. Dates and venues of the demonstrations for units in the various Army Command and R.A.F. Reserve Group areas are: Eastern Command and 61 (Eastern Reserve) Group—supply dropping: July 12th and August 23rd, Hawkinge, Kent. Paratroops: July 16th and August 1st, Fingringhoe Ranges, Essex; July 26th, Swingate Camp, Kent; July 27th, Hawkinge; August 25th, R.A.F. Station Martlesham, Suffolk. Southern Command (Southern Reserve) Group—supplies: August 22nd, Harrow Beer, Devon. Paratroops: August 1st, Perranporth, Cornwall. Western Command and 63 (Western and Welsh Reserve) Group—supplies: August 4th, Llanbedr, Merionethshire, and Angle, Pembrokeshire; August 17th, Stormy Down, Wales. Northern Command and 64 (Northern Reserve) Group—supplies: August 16th, Cowden, Kent.

*LIDLESS: To determine the general effect on the occupants of emergency hood-jettisoning, this Meteor 7 is being flown by Gloster test pilot J. Zurakowski with the cockpits quite unprotected.*

### New Attaché for China

GROUP CAPTAIN JAMES WARBURTON, who was Senior Officer in Charge of Administration, No. 11 Group, Fighter Command, for two years until his attachment to the Air Ministry Deputy Directorate of Air Foreign Liaison last October, has succeeded Brigadier L. F. Field, C.B.E., as Military and Air Attaché in China with the acting rank of Air Vice-Marshal.

### R.A.F. Permanent Commissions

THE following officers have been selected for permanent commissions in the Royal Air Force, in the branches shown:

*GENERAL DUTIES BRANCH.*

*Squadron Leaders:* P. J. Crowley, D.F.C., V. G. Hogan, D.F.C.

*Flight Lieutenant:* R. E. Dyson, D.F.C.

*TECHNICAL BRANCH.*

*Squadron Leader:* G. W. Hancock.

*Flight Lieutenants:* W. E. Collingwood, D.F.M., E. C. P. Dartnell, W. A. F. Edwards, B. F. Fermor, D.F.C., E. J. Griffiths.

*Flying Officer:* D. A. Moyce.

*CHAPLAINS BRANCH.*

*Reverends:* G. H. C. Church, C. King, W. L. Neill, M.A., E. M. Parry, R. L. W. Pratt, J. H. Storr, M.A. (C. of E.), J. Marquis (R.C.).

### Reunion

IT is proposed to hold the Annual Reunion of 612 Squadron in London on Saturday, November 12th. Ground crew will be especially welcome. Particulars can be obtained from W. N. Parsons, 24, Whitehall Gardens, West Acton, London, W.3.

*FEATHERED SEA MONSTER: Lt. C. Montgomery of No. 35 Squadron, S.A.A.F. (based at Durban), pilot of this Sunderland, was evidently determined that Pietermaritzburg crowds should appreciate that his port Twin Wasps really were inoperative.*